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Prevention of an Arms Race in Outer Space:

A Guide to the Discussions in the Conference on Disarmament

Péricles Gasparini Alves

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PREFACE

UNIDIR's mandate is contained in its General Assembly approved Statute establishing the Institute as an autonomous body within the UN System for the purpose of undertaking independent research on disarmament. That mandate requires us to provide the international community with more diversified and complete data on disarmament and international security related subjects; to promote informed participation by all States in disarmament; to assist ongoing negotiations by means of objective and factual studies and analysis and to carry out in-depth forward looking research into disarmament problems.

In 1989, with the cooperation of the Secretariat of the Conference on Disarmament (CD), UNIDIR initiated a series of research guides on the proceedings of ongoing discussions and negotiations on multilateral arms limitation and disarmament in that forum. This series of research guides is coordinated by Thomas Bernauer, a research associate at UNIDIR, and Dr Jozef Goldblat, who serves as a consultant to the project. Research guides are not aimed to be compendia of proposals or as summary records. They are intended to provide diplomats and researchers with analytical descriptions and ready reference tools to the present status of discussions and the background to the issues being discussed. Research guides, therefore, trace the origin and evolution of disarmament issues debated in the CD and external developments relevant for the understanding of the positions of the various delegations in disarmament discussions.

UNIDIR has already published two volumes - one on the negotiations towards a Chemical Weapons Convention, by Thomas Bernauer, and the other on a Nuclear Test Ban, by Thomas Schmalberger. UNIDIR has been greatly encouraged by the positive response in the diplomatic and academic communities to the publication of this series and to the wide use being made of these research guides.

The present volume on the prevention of an arms race in outer space was written by Péricles Gasparini Alves who is a research associate at UNIDIR. UNIDIR hopes that this volume will be especially useful to members of the CD. The views expressed in this publication are the responsibility of the author and not of UNIDIR. Although UNIDIR customarily takes no position on the views and conclusions expressed by the individual authors it does assume responsibility for determining whether research reports merit publication and, consequently, we commend this report to the attention of its readers.

UNIDIR would like to thank the Ford Foundation who kindly funds this series of research guides, and the Secretariat of the CD for their Co-operation.

Jayantha Dhanapala
Director

UNIDIR

United Nations Institute for Disarmament Research

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UNIDIR is an autonomous institution within the framework of the United Nations. It was established in 1990 by the General Assembly for the purpose of undertaking independent research on disarmament and related problems, particularly international security issues.

The work of the institute aims at:

1. Providing the international community with more diversified and complete data on problems relating to international security, the armaments race, and disarmament in all fields, particularly in the nuclear field, so as to facilitate progress, through negotiations, toward greater security for all States and toward the economic and social development of all peoples;

2. Promoting informal participation of all States in disarmament efforts;

3. Assisting ongoing negotiations on disarmament and continuing efforts to ensure greater international security at a progressively lower level of armaments; particularly nuclear armaments, by means of objective and factual studies and analyses;

4. Carrying out more in-depth, forward looking, and long-range research on disarmament, so as to provide a general insight into the problems involved, and stimulating new initiatives for new negotiations.

The contents of UNIDIR publications are the responsibility of the authors and not of UNIDIR. Although UNIDIR takes no position on the views and conclusions expressed by the authors of its research reports, it does assume responsibility for determining whether they merit publication.

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LIST OF ACRONYMS

ABM = Anti-Ballistic Missile
ADI = Air Defense Initiative
APSI = Agency for the Processing of Satellite Image
ASAT - Anti-Satellite Weapons
ASBM - Air-to-Surface Ballistic Missile
ATBM - Anti-Tactical Ballistic Missile
BDA - Bomb Damage Assessment
BM - Ballistic Missile
C^3 = Command, Control, and Communications
CD - Committee on Disarmament (1979-1983)
CD = Conference on Disarmament (1984-)
CCD = Conference of the Committee on Disarmament (1969-1979)
CBMs = Confidence-Building Measures
CLs = Chemical Lasers
COPUOS = Committee on Peaceful Uses of Outer Space
DANASATs= Direct-Ascent Nuclear Anti-Satellites
DSP = Defense Support Programme (US)
DEWs = Directed Energy Weapons
DST = Defense & Space Talks
ENCD = Eighteen Nations Committee on Disarmament (1962-1969)
ELs = Excimer Lasers
ELINT = Electronic-intelligence
EORSAT = ELINT Ocean Reconnaissance Satellites
ERIS = Exo-Atmospheric Interceptor System
EDI = European Defense Initiative
FELs = Free Electron Lasers
HEDI = High Endoatmospheric Defense Interceptor
HEO = Higher-Earth Orbit
HPRF = High-Power Radio Frequency
IAEA = International Atomic Energy Agency
ICBM = Intercontinental Ballistic Missile
IFOV = Instantaneous Field of View
INF = Intermediate-Rance Nuclear Forces
IRBM = Intermediate-Range Ballistic Missile
ITSS = Tactical Integration of Satellite Systems
GEO = Geosynchronous Orbit
KEWs = Kinetic Energy Weapons
KITE = Kinetic Energy Kill Vehicle Integrated Technology Experiment
MAD = Mutual Assured Destruction
MAS = Mutual Assured Survival
MOU = Memorandum of Understanding
NATO = North Atlantic Treaty Organization
NEO = Near-Earth Orbits
NDEWs = Nuclear-Driven Directed Energy Weapons
NOSS = Navy' Ocean Surveillance Satellites
NPBs = Neutron-Particle Beams
NST = Nuclear & Space Talks
NTMs - National Technical Means
OTA Office of Technological Assessment (US)
PAROS = Prevention of an Arms Race in Outer Space
PAXSAT - Peace Satellite (Canada)
RDT&E - Research, Development, Testing and Evaluation
RORSAT - Active Radar Ocean Reconnaissance Satellites
RVs - Reentry Vehicles
SAR = Synthetic Aperture Radar
SBI Space-Based Interceptor
SDI = Strategic Defense Initiative
SDIO = Strategic Defense Initiative Organization
SLBM = Sea-Launched Ballistic Missile
SPOT = Système Probatoire d'Observation de la Terra
START = Strategic Arms Reduction Talks
TBT = Test Ban Treaty
TNCD = Ten Nations Committee on Disarmament (1959-1961)
UHF = Ultrahigh Frequency
XrLs = X-ray Lasers
WTO = Warsow Treaty Organization
GCD = General and Complete Disarmament
GLOM = Global Low Orbiting - message Relay

Author's Preface

Writing a Guide on the history and development of the discussions on the *prevention of an arms race in outer space* for the intention of the diplomatic and academic communities is not the easiest of tasks. Despite its relative abundance, the literature on this aspect of activity in outer space is diverse and widely scattered and therefore not easily available. In addition, official statements made by delegations to the disarmament fora tend to be general in nature, although they are very useful primary sources.

However, in fulfilling my responsibility as a UNIDIR Researcher, I was much supported and encouraged by a number of people to whom I would like to express my gratitude here. First, I should like to mention Professor Serge Sur, Deputy Director of UNIDIR, who was unsparing in offering his counsel and guidance, especially in respect of the legal implications of military and military-related activity in space.

I must also extend my thanks to Dr Jozef Goldblat, Consultant to UNIDIR, whose unfailing patience in reviewing my many different drafts was of the greatest assistance in keeping this work within manageable limits.

Although, for obvious reasons, I cannot mention them by name, I also owe special thanks to all those members of the disarmament delegations in Geneva with whom I have had so many valuable and enlightening discussions, and I hope they will accept this acknowledgement here of my gratitude.

In conclusion, I would add that English is not my mother-tongue, so I am also indebted to Ritchie Pannetti, of Geneva, who untangled my syntax on several occasions.

It goes without saying that responsibility for any errors or omissions in this Guide is entirely mine.

October 1991
Péricles Gasparini Alves

General Introduction

This two-part Guide is intended to serve as a reference manual on the history and progress of the discussions on the prevention of an arms race in outer space held by the Conference on Disarmament (CD) at Geneva and its subsidiary body, the *Ad Hoc* Committee on the Prevention of an Arms Race in Outer Space or *Ad Hoc* PAROS Committee.

However, any attempt to analyze those discussions is handicapped by a number of factors. One, it is not always easy to discern the exact position of each delegation on every aspect of the issues debated at the CD and the *Ad Hoc* PAROS Committee, because delegates' official statements on outer space tend to be couched in general terms and, moreover, may even pass unnoticed if they should be made in other contexts. Two, not all of the working papers received by the *Ad Hoc* Committee are published in its annual reports to the Conference on Disarmament, and three, the *Ad Hoc* Committee's meetings are held *in camera*.

Part One is historical in nature in that it enumerates the reasons why various United Nations resolutions called for the establishment of the *Ad Hoc* PAROS Committee. It also describes that Committee's programme of work in the light of developments which could have a bearing on an arms race in outer space, as well as the international agreements which are or could be of relevance to these issues. The legal status of outer space and, where applicable, the prohibitions in force in respect of weapon systems and weapon development, deployment, and use in or via outer space are also reviewed.

Part Two of the Guide seeks to provide a summary of the efforts being made to prevent an arms race in outer space by identifying salient proposals of interest submitted by participating States. However, although it cannot, for the reasons explained above, purport to contain a comprehensive review of all the proposals which have been laid before the *Ad Hoc* Committee or brought up in its discussions, the Guide does constitute a methodological approach which reflects the structure of the debate in the CD and its subsidiary *Ad Hoc* PAROS Committee. It therefore highlights the core of the *Ad Hoc* Committee's deliberations, particularly the discussions on proposed amendments to existing treaties, new treaty proposals, confidence-building measures, and the possible institutional monitoring and verification measures of any future agreement to prevent an arms race in outer space.

The Guide concludes with a resumé of the most important issues already considered by the *Ad Hoc* Committee and a list of the specific questions it will be addressing in the future. The Guide covers developments and discussions in the CD and the *Ad Hoc* PAROS Committee up to and including September 1991.

PART I:

MILITARY SPACE ACTIVITIES AND THEIR LEGAL LIMITATION

CHAPTER I: THE NEED FOR SECURITY IN OUTER SPACE

A. Origins of the *Ad Hoc* Committee

1. Institutional Framework

The question of an arms race in outer space has long been on the agenda of bilateral US-Soviet and multilateral fora concerned with arms limitation and disarmament, and it was, in actual fact, from those discussions that the idea of the prevention of an arms race in outer space came to the fore. Further reinforcement to the proposal was provided by the technological, military, and political developments of the late 1950s and early 1960s which included, among others, the evolution of nuclear weapons technology, weapon delivery systems such as endo-atmospheric and exo-atmospheric launchers,[1] and a political/military relationship between the United States and the Soviet Union which contributed to R&D on Anti-Satellite (ASAT) weapons.

Until the end of the 1950s, proposals to counter a possible arms race in outer space came directly under the province of the United Nations General Assembly and the Disarmament Commission,[2] and were twofold in approach: *General and Complete Disarmament* (GCD) or *Partial Disarmament Measures* (PDM). In the case of GCD, these proposals were aimed at (1) a prohibition on the testing or deployment of weapons of mass destruction on land, at sea or in the air, intrinsically including the outer space environment and (2) an assurance that outer space would be used for peaceful and scientific purposes only. Such was the basis of the working papers submitted to the Sub-Committee of the Disarmament Commission in 1957. One of the proposals provided for ground, sea, and aerial inspection of conventional and nuclear disarmament including the launching of objects through outer space.[3] In the case of PDM, the proposals sought to ensure that the launching of ICBMs [Intercontinental Ballistic Missiles][4] and other objects either passing through space or placed in orbit would not be used for military purposes. However, despite the difference in approach, the GCD and PDM had a common goal in seeking the introduction of measures to assuage the then-growing preoccupation that there might be a large-scale surprise attack by one of the major powers.

Nevertheless, it was PMD which began to gain support in the late 1950s as the most practical means of achieving disarmament measures. United Nations discussions centred principally on the questions of surprise attack and the launching of rockets into outer space, and these led to the adoption of a General Assembly (GA) Resolution in

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[1] Endo-atmospheric launchers are vehicles designed to boost a payload up to the limits of the atmosphere. Exo-atmospheric launchers, however, are launchers designed to boost a payload beyond that limit and therefore into outer space. For a discussion on the boundaries of air space and outer space, see *infra*, Part I, B, 1, a. Outer Space.

[2] For a discussion on the early disarmament fora and proposals, see *The United Nations and Disarmament: 1945-1970*, New York: United Nations, 1970; and the UN yearly series entitled *The United Nations Disarmament Yearbook*, New York: United Nations.

[3] See, for instance, "Working Paper submitted by Canada, France, the United Kingdom and the United States," *Official Record for the Disarmament Commission, Supplement for January to December 1956*, DC/83, annex 5 (DCSC.1/66). See also a draft resolution submitted by Yugoslavia entitled "Reduction, limitation and balanced reduction of all forces and all armaments; conclusion of an international convention (treaty) on the reduction of armaments and the prohibition of atomic, hydrogen and other weapons of mass destruction," *Official Records of the General Assembly*, A/C.1/L.180, 24 October 1957.

[4] For a definition of ICBMs, see *infra*, Chapter I, B, 2, Ballistic Missile Technology.

late 1957 calling for a study on an inspection system which would ensure the peaceful use of outer space[5]. The following year, emphasis was re-focused in two directions: banning the use of outer space for military purposes, and promoting international co-operation in outer space.[6] The international community favoured the latter with the establishment of an *Ad Hoc* Committee on Peaceful Uses of Outer Space in 1958 which was charged to report to the General Assembly on various aspects of the peaceful use of outer space, including: activities of the United Nations and its specialized agencies, dissemination of data on outer space research; co-ordination of national research programmes; future international arrangements to facilitate international co-operation in outer space within the framework of the United Nations, and legal problems which might arise as a result of the exploration of outer space.[7] The Committee was later given permanent status as the Committee on Peaceful Uses of Outer Space (COPUOS).[8]

It was not until the mid-1960s, however, with the development of military space technology such as ballistic missile and satellite interceptors, and the establishment of additional negotiating fora, that the basic institutional framework for the discussion of military space activities was brought into being. At the first session of the ENCD [Eighteen Nations Committee on Disarmament],[9] in March 1962, the USSR and the United States of America presented a proposed treaty and a GCD programme which contained specific references to the rising concern that States might put into orbit, or station in outer space, devices capable of carrying weapons of mass destruction,

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[5] "Reduction, limitation and balanced reduction of all forces and all armaments; conclusion of an international convention (treaty) on the reduction of armaments and the prohibition of atomic, hydrogen and other weapons of mass destruction," *Official Records of the General Assembly*, A/1148 (XII), 14 November 1957.

[6] The position of the two major military powers was not identical. The Soviet Union looked at the military and peaceful use of outer space as a whole. In November 1958, for example, the USSR submitted a draft resolution calling for a ban on the use of cosmic space for military purposes, an understanding by States to launch rockets into space only under an agreed international programme, and the establishment of a United Nations agency for international cooperation in space research and activities. The United States, however, stressed the need for the establishment of a new body within the framework of the United Nations which would address both international cooperation in the field of space exploration and the legal issues deriving therefrom. For a short discussion on these proposals and references, see "Questions of the Peaceful Use of Outer Space: (a) The Banning of the Use of Cosmic Space for Military Purposes, the Elimination of Foreign Military Bases on the Territory of Other Countries and International Co-operation in the Study of Cosmic Space; (b) Programme for International Co-operation in the Field of Outer Space," *Official Records of the General Assembly*, A/4009, 28 November 1958.

[7] See "Questions of the Peaceful Use of Outer Space," *Official Records of the General Assembly*, A/RES/1348 (XIII), 13 December 1958; for a short elaboration of these developments, see also "Statement submitted by Mexico to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 540, 6 March 1990, pp. 3-5.

[8] The Committee on Peaceful Uses of Outer Space was established on 12 December 1959 by the General Assembly to foster international co-operation in the peaceful uses of outer space. The Committee's mandate was to study ways and means of assisting the practical implementation of national and international research projects, as well as to undertake studies on legal problems that might arise in the various peaceful uses of outer space. See "International Co-operation in the Peaceful Uses of Outer Space," *Official Records of the General Assembly*, 1472 (XIV), 856th, 12 December 1959.

[9] The Eighteen Nations Committee on Disarmament was established in 1961 as a result of the enlargement of the Ten-Nation Committee on Disarmament (TNCD). The TNCD was established in 1959 after an agreement between the Foreign Ministers of the United States, the United Kingdom, France, and the Soviet Union. It was comprised of members of the NATO [North Atlantic Treaty Organization] (Canada, Italy, France, United Kingdom, the United States) and the WTO [Warsaw Treaty Organization] (Bulgaria, Czechoslovakia, Poland, Romania, the Union of Soviet Socialist Republics) alliances. The enlargement of the TNCD broadened the regional and political representation of the negotiating body through the participation of Brazil, Burma, Ethiopia, India, Mexico, Nigeria, Sweden, and the United Arab Republic. For discussions and decisions on the formation of these fora, see "Speech by Mr Herter (United States of America)", *Official Records of the General Assembly*, 797th, 17 September 1959, pp. 12-13; "Letter dated 20 September 1961 from the Permanent Representatives of the Union of Soviet Socialist Republics and the United States of America to the United Nations Addressed to the President of the General Assembly, *Official Records of the General Assembly*, A/4879, 20 September 1961; "Questions of Disarmament," *Official Records of the General Assembly*, 1722 (XVI), 1085th, 20 December 1961.

particularly nuclear weapons.[10] This concern was coupled with a request that advance notification of the launching and tracking of missiles and other space vehicles should be provided.[11] During these same deliberations at the ENCD, the Canadian delegation proposed changes to the way that the Committee had been considering the arms race issue.[12] Canada's first proposal was a draft declaration recalling and endorsing the two main subjects of concern expressed in the Soviet and American proposals. Secondly, Canada also proposed that the talks on outer space be separated from those on nuclear and conventional weapons and that outer space should become a separate item on the Committee's Agenda. To meet this proposal, two United Nations negotiating bodies were taken into consideration, one being the COPUOS, and the other a special subsidiary committee of the ENCD which had just been established to discuss collateral disarmament measures. However, COPUOS's aim from the very beginning had been clearly set to deal exclusively with the *peaceful uses* of outer space, which disqualified it as a forum to discuss disarmament matters,[13] so that the committee on collateral measures was the obvious candidate for this mandate.

Thus, as the ENCD discussions proceeded, proposals were tabled furthering the idea of disassociating outer space discussions from the GCD. In June 1963, the Mexican delegation to the ENCD presented a proposal[14] which included some of the basic elements contained in the Canadian draft of the previous year. However, the Mexican draft went further by proposing a ban on the testing and stationing in orbit of launching bases for weapons of any kind. Moreover, an extension of this ban would also have made it binding for celestial bodies. The Mexican proposal was largely prompted by allegations of nuclear and non-nuclear-armed ground-based interceptor satellite weapons testing which, having reportedly been under way since the late 1950s, had gained momentum in the 1960s.[15]

However, other outer space initiatives were also undertaken outside this multilateral Committee. About a month after Mexico tabled its proposal, the tripartite

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[10] See "Treaty on General and Complete Disarmament Under Strict International Control," submitted by the Union of Soviet Socialist Republic to the *Conference of the Eighteen Nations Committee on Disarmament*, ENCD/2, 19 March 1962; "Declaration on Disarmament: Programme for General and Complete Disarmament in a Peaceful World," submitted by the United States of America to the *Conference of the Eighteen Nations Committee on Disarmament*, ENCD/6, 19 March 1962; "Report of the United Nations Disarmament Commission," *Conference of the Eighteen Nations Committee on Disarmament*, ENCD/42, 31 May 1962. Different versions of these proposals were presented by both the Western Powers and the United States in 1960 (see "A Plan for General and Comprehensive Disarmament in a Free and Peaceful World," submitted by Canada, France, Italy, the United Kingdom of Great Britain and Northern Ireland, and the United States of America to the *Ten Nations Committee on Disarmament*, TNCD/3, 16 March 1960; and "A Programme for General and Complete Disarmament under Effective International Control," submitted by the United States of America to the *Ten Nations Committee on Disarmament*, TNCD/7, 27 June 1960).

[11] ENCD/2, *Op. cit.*, Chapter III, Article 14, p. 11; and ENCD/6, *Op. cit.*, Stage I, E, p. 5.

[12] See "Statement by the Honourable Howard Green, Secretary of State for External Affairs of Canada, in the 18-Member Disarmament Conference," submitted by Canada to the *Conference of the Eighteen Nations Committee on Disarmament*, ENCD/17, 28 March 1962; "An Outline Review: USSR and USA Disarmament Proposals," submitted by Canada to the *Conference of the Eighteen Nations Committee on Disarmament*, ENCD/19/Rev. 1, 6 April 1962.

[13] Irrespective of this legal constraint imposed on the COPUOS, most of the international agreements forming the body of space law covering peaceful activities of outer space, and concomitantly prohibiting certain hostile uses of that environment, have derived from discussions in this negotiating body, i.e., the 1967 Outer Space Treaty.

[14] "Outline Draft Treaty on the Placing in Orbit and the Stationing in Outer Space of Nuclear Weapons," submitted by Mexico to the *Conference of the Eighteen Nations Committee on Disarmament*, ENCD/98, 21 June 1963.

[15] Among the alleged weapons programmes were, for example, the American Zeus, Nike-X, and Thor missiles, as well as Anti-Ballistic Missiles such as the Soviet Galosh (US designation) and the American Sprint and Spartan missiles; for a short but concise discussion on these tests and deployments, see *Disarmament: Problems Related to Outer Space*, UNIDIR, New York, United Nations Publication, 1987, p. 31-70; *Satellite Warfare: A Challenge for the International Community*, by Pierre Lellouche, ed., Geneva, IFRI/UNIDIR, New York, United Nations Publication, 1987.

negotiations between the Soviet Union, the United Kingdom, and the United States on nuclear weapons testing came to an end. The ENCD was then presented with the final draft of the first legal instrument containing specific measures for arms limitation in outer space - the Test Ban Treaty (TBT), which prohibited State Parties from carrying out nuclear weapons test explosions, or any other nuclear explosions, in the atmosphere and beyond its limits, including outer space.[16] The TBT, coupled with successive Soviet Union and the United States statements in the General Assembly and discussions in the ENCD on the danger of the spread of the arms race to outer space, provided the basis for the General Assembly's adoption of a resolution in October of the same year banning the placing in orbit of weapons of mass destruction.[17]

The possibility of military activity in outer space, whether by placing weapons in orbit or by using outer space as a theatre of war, transformed the use of outer space into a controversial political and military issue. Despite this, if not because of it, the Outer Space Treaty (OST) was duly signed in the late 1960s, thereby reinforcing the body of international law governing space activities.[18] However, the OST was not enough to hinder the possibility of an arms race in outer space, nor were the bilateral Soviet/US negotiations which began in 1969 and culminated in 1972 with the Strategic Arms Limitation Talks I (SALT I) and the Anti-Ballistic Missile (ABM) Treaty. Both of these are weapon systems-specific agreements and neither deals with the entire spectrum of military activities in outer space.

Other measures taken within the United Nations framework also gave impetus to the outer space discussions, so that they gained a new dimension when the ENCD was renamed the Conference on the Committee on Disarmament (CCD) and restructured to increase the geographical and political participation of its members in 1969.[19] Later, in 1978, the CCD became the Committee on Disarmament (CD) and called for the organization of negotiations on the prevention of an arms race in outer space.[20] Bilaterally, there was a further development in June 1978 with the initiation of discussions between the Soviet Union and the United States on ASAT systems. In the following year, after three rounds of bilateral talks, the United States halted these negotiations on the grounds that an agreement involving such systems would pose

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[16] "Treaty Banning Nuclear Weapons Test in the Atmosphere, in Outer Space, and Underwater," submitted by the Union of Soviet Socialist Republics, United Kingdom, and the United States of America to the *Conference of the Eighteen Nations Committee on Disarmament*, ENCD/100, 30 July 1963; for a detailed discussion on the outer space aspect of this treaty, see *infra*, Part I, Chapter II, A, 4. Partial Test Ban.

[17] "Questions of General and Complete Disarmament," *Official Records of the General Assembly*, A/RES/1884 (XVIII), 17 October 1963.

[18] For a detailed discussion on this treaty, see *infra*, Chapter II, C, 2.

[19] Committee membership was increased to 26 participants by the inclusion of Argentina, Hungary, Japan, Morocco, Mongolia, The Netherlands, Pakistan, and Yugoslavia. See "Questions of General and Complete Disarmament," *Official Records of the General Assembly*, A/RES/2602 B (XXIV), 16 December 1969. In 1974, the Committee's membership was again increased, to 31 members, by the admission of the Federal Republic of Germany, the German Democratic Republic, Iran, Peru, and Zaire. See "Questions of General and Complete Disarmament," *Official Records of the General Assembly*, A/RES/3261 B (XXIX), 9 December 1974.

[20] The Conference on Disarmament is a disarmament negotiating forum open to the nuclear weapons States and 35 other States: Algeria, Argentina, Australia, Belgium, Brazil, Bulgaria, Canada, China, Cuba, Czech and Slovak Federal Republic, Egypt, Ethiopia, France, German Democratic Republic, Federal Republic of Germany, Hungary, India, Indonesia, Islamic Republic of Iran, Italy, Japan, Kenya, Mexico, Morocco, Myanmar, The Netherlands, Nigeria, Pakistan, Peru, Poland, Romania, Sri Lanka, Sweden, Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland, United States of America, Venezuela, Yugoslavia, and Zaire. See also "Rules of Procedure of the Conference on Disarmament," *Conference on Disarmament*, CD/8/Rev.3, 21 August 1990. German unification has changed this composition to a total of 39 countries. See also *Final Document: First Special Session of the General Assembly on Disarmament, 1978*, United Nations, New York, 1978.

technical and other problems of verification which were judged not to be solvable at that time.[21]

In the second half of the 1970s, and in fact right up until the early 1980s, informal and formal discussions still addressed the question of whether or not outer space issues merited the attention they received at the United Nations. Some delegations argued that discussions on the prevention of an arms race in outer space should be held within the framework of the Committee on Disarmament because of the legitimacy of its mandate, while others suggested that the inclusion of outer space on the CD agenda should be avoided or even that the issue should be transferred to another forum. The principal argument in this connection maintained that discussions on outer space would be detrimental to the efforts being made in respect of another CD agenda item - item 2, nuclear disarmament - which had in actual fact priority over all the other disarmament issues. Finally, a series of GA resolutions adopted during this period called for two main measures.[22] One concerned the establishment of an *Ad Hoc* working group to negotiate the prevention of an arms race in outer space at the CD, thereby explicitly endorsing the competence of that body. The other measure called for negotiations to prohibit anti-satellite systems as a matter of priority to achieve the objectives of CD agenda item 2.[23] The support for these GA resolutions was evident when draft treaties were tabled at the CD in 1981 and 1982 which prohibited the stationing of weapons of any kind in outer space, or in specific anti-satellite weapons.[24] In 1982, a new subject, *Prevention of an Arms Race in Outer Space* (PAROS), became item 7 of the CD agenda, although no agreement was reached as to the objective or scope of a special working group on this matter.[25]

Outer space was again at the forefront of arms limitation and disarmament discussions when, in March 1983, President Reagan's Administration launched a strategic defence programme based on the elimination of the threat of offensive ballistic missiles. Given the nature of intercontinental ballistic missile trajectory and mission, any effective strategic defence would entail the development of weapons to be used in or via the outer space environment. The Reagan Administration's programme therefore revived and intensified fears that the development of a missile defence system would constitute a breach of the obligations imposed by the bilateral ABM Treaty. Such apprehension was coupled with an already growing concern that the most immediate threatening development in terms of an arms race in outer space was the testing and deployment of

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[21] For a discussion and references on this subject, see *Disarmament: Problems Related to Outer Space, Op. cit.*, pp. 180-82.

[22] "Prevention of Arms Race in Outer Space", *Official Records of the General Assembly*, A/RES/36/97 C, 9 December 1981; "Conclusion of a Treaty on the Prohibition of the Stationing of Weapons of Any Kind in Outer Space", *Official Records of the General Assembly*, A/RES/36/99, 9 December 1981.

[23] For a discussion of these resolutions, see, e.g., *Disarmament: Problems Related to Outer Space, Op. cit.*, pp. 117-124.

[24] See "Letter dated 6 April 1982 from the representative of the Union of Soviet Socialist Republics addressed to the Chairman of the Committee on disarmament transmitting the draft treaty on the prohibition of the stationing of weapons of any kind in outer space submitted to the thirty-sixth session of the General Assembly," *Committee on Disarmament*, CD/274, 7 April 1982; "Working Paper on the Prevention of an Arms Race in Outer Space," submitted by the Mongolian People's Republic to the *Committee on Disarmament*, CD/272, 5 April 1982; "Prevention of an Arms Race in Outer Space," submitted by France to the *Committee on Disarmament*, CD/375, 14 April 1983. See also earlier efforts such as "Additional Protocol to the 1967 'Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, Including the Moon and Other Celestial Bodies' with a view to Preventing an Arms Race in Outer Space," submitted by Italy to the *Committee on Disarmament*, CD/9, 26 March 1979.

[25] See the draft mandate for *Ad Hoc* Working Group on Item 7 of the Agenda of the Committee on Disarmament, entitled "Prevention of An Arms Race in Outer Space", submitted by the Group of 21 to the *Committee on Disarmament*, CD/329, 17 April 1982; see also *The United Nations Disarmament Yearbook: 1986*, New York, United Nations Publication, 1987, pp. 288-91.

physical and technical means to destroy, damage or interfere with space objects - in other words, ground, air, and space-based anti-satellite weapons.

Later, at the end of 1984, a renewed call for the establishment of the *Ad Hoc* PAROS Committee was supported by an almost unanimous vote (150 to none, with only the USA abstaining).[26] Lastly, in 1985, bilateral USSR/USA space talks, as well as multilateral discussions at the CD on the prevention of an arms race in outer space, were initiated in Geneva.

2. Mandate

In 1985, agreement was reached on the mandate of the *Ad Hoc* PAROS Committee, which was discussed under agenda item 5 of the CD agenda. The *Ad Hoc* Committee has never become a permanent body and each year the GA requests that it be re-established for the next round of discussions. This renewal of mandate for the current year is decided by the CD in plenary session, where other procedural matters, such as the appointment of a chairperson and requests for participation from non-permanent member states, are also considered.[27]

The scope of the *Ad Hoc* Committee's mandate is rather restricted. In some ways it differs from, while in others it resembles, other subsidiary bodies of the CD such as the *Ad Hoc* committees on chemical weapons, radiological weapons, nuclear test ban or assurances.[28] It is worth noting here that, since 1984, GA resolutions request the CD to establish or re-establish the *Ad Hoc* Committee "...with a view to undertaking negotiations for the conclusion of an agreement, as appropriate, to prevent an arms race in all its aspects in outer space,"[29] but in actual fact these negotiations have never been undertaken. Every year, agreement on the mandate of the Committee is subject to consultation and to date the basis of the mandate entrusted to the Committee is the identification, through substantive and general considerations, of all the issues deemed to be relevant to the prevention of an arms race in outer space. This wording clearly limits the role of the Committee, which is not, therefore, a negotiating forum as is the case with its counterpart on chemical weapons.

Since its inception, the *Ad Hoc* PAROS Committee has continuously examined three subject areas of its mandate:[30]

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[26] "Prevention of an Arms Race in Outer Space," *Official Records of the General Assembly*, A/RES/39/59, 12 December 1984; see also "Prevention of an Arms Race in Outer Space," *Official Records of the General Assembly*, A/RES/40/87, 12 December 1985.

[27] See, for example, "Mandate for the Ad Hoc Committee under item 5 of the agenda of the Conference on Disarmament entitled Prevention of an Arms Race in Outer Space, *Conference on Disarmament*, CD/1059, 14 February 1991, and previous documents under the same title, e.g., CD/976, 9 March 1990.

[28] For a discussion of the role and function of the *Ad Hoc* Committee on Chemical Weapons, see *The Projected Chemical Weapons Convention: A Guide to the Negotiations in the Conference on Disarmament*, by Thomas Bernauer, New York, United Nations Publication, 1990; on the *Ad Hoc* Committee on Test Ban, see *In the Pursuit of a Comprehensive Test Ban Treaty: A Guide to the Debate in the Conference on Disarmament*, by Thomas Schmalberger, New York, United Nations Publication, 1991; and *The United Nations Disarmament Yearbook* series.

[29] A/RES/39/59, *Op. cit.*; "Prevention of an Arms Race in Outer Space," *Official Records of the General Assembly*, A/RES/44/112, 19 January 1990, p. 5.

[30] For a longer discussion on these subject areas, see the annual "Reports of the *Ad Hoc* Committee on the Prevention of an Arms Race in Outer Space," submitted to the *Conference on Disarmament*, CD/954, 24 August 1989; "Report of the *Ad Hoc* Committee on the Prevention of an Arms Race in Outer Space," submitted to the *Conference on Disarmament*, CD/1034, 16 August 1990; and "Report of the *Ad Hoc* Committee on the Prevention of an Arms Race in Outer Space," submitted to the *Conference on Disarmament*, CD/1105, 23 August 1991.

- Issues related to the prevention of an arms race in outer space;
- Existing agreements governing space activities;
- Existing proposals and future initiatives on the prevention of an Arms Race in Outer Space.

The need to tackle effectively all the issues relevant to future negotiations requires consideration of a wide range of topics, and these are discussed by the Committee in general terms within the context of multilateral negotiations. One of the objectives considered by the Committee is the potential danger for international security should space become the theatre of an arms race either because of testing or actual deployment of weapons. Since multilateral measures to prevent an arms race in outer space cannot be considered in a political, military or economic vacuum, other objectives contemplated by the Committee include the need to ascertain the interrelationship between the prevention of an arms race in outer space and arms limitation and disarmament in other areas of security, such as nuclear, chemical, and conventional disarmament. This, of course, encompasses an understanding of the relationship between bilateral and multilateral talks. Bilateral discussions include efforts to reach agreement which is distinctive in both terms of weapon systems-specificity and legal scope. Multilaterally, however, discussions concentrate on initiatives which embrace much wider aims on weapon systems, legal constraints, and in the number of adherents to an eventual agreement.

The Committee also dwells on the essential question of the definition of space weapons, as well as on several other legal and technical terms and concepts, a good number of which are still in the early stages of their development. In the further discharge of its responsibility, the Committee also considers any other agreements which are relevant to the outer space dimension of international security, including an assessment of existing prohibitions and any shortcomings in the international public law on outer space.

Last but not least, the question of verifying both existing and future agreements on outer space, and its significance for the credibility of such agreements, has also been discussed. The *Ad Hoc* Committee's discussions accordingly also evaluate the technical feasibility and political implications of monitoring compliance should an agreement on outer space be signed. Another important issue is the question of confidence-building measures. Here the objective is to assess the development of any such measures to foster the peaceful use of outer space and transparency in space and space-related activities, thus enhancing the prospects for international security in this environment.

The nature of the *Ad Hoc* Committee's mandate has been the subject of disagreement among delegations since 1985. Several delegations - usually those belonging to the Group of 21 and the former Group of Socialist Countries (now known as the Group of East European countries) - would like to entrust the Committee with the task of negotiating an agreement or agreements on the prevention of an arms race in outer space.[31] Certain delegations in the Group of Western Countries, on the other hand, are

[31] For example, in 1989, the Group of 21 stated its regret that the mandate of the Committee had not yet been modified to include the possibility of actually undertaking negotiations as a result of the position taken by the Group of Western counties (see "Statement (continued...)

against such a change in the Committee's mandate. An increasing number of delegations in this group maintain that the time is not yet appropriate to undertake negotiations in the Committee because of problems in the interpretation of several of the issues being discussed. The reasons for this stand can be seen in the Federal Republic of Germany's explanation of its position on the question:

> As long as the prevailing substantive and methodological divergences prevail, it does not make sense to call for 'negotiations' without knowing with precision the real objective, need, purpose and prospect for any of the intended conventions, treaties, amendments or regulations that are being urged. Moreover, it would not make sense to hurry into regulations which could contain troublesome ambiguities generated by superficial compromises, unbalanced approaches, lack of technical and juridical precision and imprecise definitions."[32]

However, other reasons for delegations not to favour a change in the Committee's mandate are also external to the Committee - for example, progress in bilateral US/USSR discussions on outer space is seen as a necessary preliminary accomplishment before starting negotiations in a multilateral forum such as the *Ad Hoc* PAROS Committee.[33]

These divergent stands have nevertheless not precluded the *Ad Hoc* PAROS Committee from giving in-depth consideration to the matters contained in its present mandate.

B. Issues related to the Prevention of an Arms Race in Outer Space

1. Definition of Terms

The definition of key terms concerned with the prevention of an arms race in outer space has become the subject of considerable concern over the years and some delegations have repeatedly emphasized the importance of the work entrusted to the Committee.[34] To reach collectively agreed definitions of fundamental concepts and the

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[31](...continued)
submitted by Egypt to the *Conference on Disarmament*, CD/PV.493, 9 March 1989, pp. 6-7); see also discussion in "Statement submitted by Venezuela to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 543, 15 March 1990, pp. 20-21; "Statement submitted by Egypt to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 550, 10 April 1990, pp. 14-15; "Statement submitted by Venezuela to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 571, 7 August 1990, p. 12; "Statement submitted by Chile to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 585, 28 February 1991, p. 8; "Statement submitted by Venezuela to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 588, 21 March 1991, p. 18; "Statement submitted by Myanmar to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 596, 20 June 1991, p. 8.

[32] "Statement submitted by the Federal Republic of Germany to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 502, 11 April 1989, p. 3.

[33] For example, "Statement submitted by Canada to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 402, 2 April 1987, p. 25.

[34] For a discussion on definitions, see statements made by Canada, Chile, Peru, Egypt, and India in "Terminology Relevant to Arms Control and Outer Space," Working Paper submitted by Canada to the *Conference on Disarmament*, CD/716, 16 July 1986; "Legal Problems Raised by the Militarization of Outer Space," submitted by Chile to the Conference on Disarmament, *Conference on Disarmament*, CD/915, 26 April 1989; "Statement submitted by Peru to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 472, 9 August 1988, pp. 6-7; CD/PV 550, *Op. cit.*, pp. 15-16 (Egypt); "Statement submitted by India to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 529, 24 August 1989, pp. 8-10. For a statement identifying terms
(continued...)

many key terms is no easy task, especially because the adoption of common definitions must take account of complex technical, legal, and doctrinal meanings of words, phrases, terms, and weapon systems, as well as military and military-related space activities. Definition is therefore generally perceived as a fundamental element in conditioning the clarity of treaties in both positive law and intended obligations of future agreements.[35]

Although the CD has considered many of these terms, only a few of them will be examined here - namely, the definitions of outer space, the different possible uses of outer space, and the different categories of space weapons. To date, only a few proposals defining space weapons in general and certain ASAT weapons have been tabled. This emphasis on ASAT weapons is not surprising, given that these weapons have been the centre of attention since the debates on the prevention of an arms race in outer space first started, although fear of the unknown implications of large-scale possession and use of ASAT weapons, and the destabilizing effect this can have on international security, may also be intrinsic reasons. In the case of certain other key terms, however, discussion on their definition is limited to the establishment of *guidelines* for their interpretation. The Chilean delegation has described the situation with regard to the lawfulness of space activities, which it views as being centred on compliance with the rules set forth in Article 1, paragraph 1, of the Outer Space Treaty rather than on the absence of prohibitive norm.[36] There has also been a contrary argument in drawing up interpretation guidelines - as distinct from actually defining the concept *per se* - to the effect that unlawful space activities should be judged in accordance with the relevant provisions of international law, not internal law.[37]

However, it is interesting to note that no comprehensive definitions or interpretation guidelines have yet been presented on other major issues. This is especially true in the case of "space object", despite insistence on the need for a precise definition of this term.[38] Again, there has been no in-depth proposal defining the boundaries of outer space. This absence of commonly agreed definitions is also noticeable in space activities, and the need has often been expressed, particularly during discussions aimed at creating or furthering confidence between States, for an agreement on definitions including military space and space-related activity and civil operations on the ground having a direct impact on military space activity. This is why reports of the *Ad Hoc* PAROS Committee contain remarks by some delegates to the effect that the discussions

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[34](...continued)
such as *peaceful uses*, *militarization*, *stabilizing*, *permitted* or *prohibited* military and military-related activities of outer space, see "Statement submitted by Australia to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 497, 23 March 1989, pp. 6-7. A questionnaire, entitled "Terminological Issues Relevant to the Prevention of an Arms Race in Outer Space," has been distributed to all delegations in the form a "Friend of the Chair" non paper during the 1991 session of the *Ad Hoc* PAROS Committee. The basic aim of this questionnaire is to provide a clear guide as to what the areas of fundamental differences in the interpretation of certain terms are, and whether there are any areas of convengence.

[35] One practical example regarding positive law was the Venezuelan proposal to introduce a definition of space weapons in the Outer Space Treaty, see "Statement submitted by Venezuela to the *Conference on Disarmament*," CD/PV.471, 4 August 1988, p. 26; "Proposed Amendment to the Treaty on the Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," submitted by Venezuela to the *Conference on Disarmament*, CD/851, 2 August 1988.

[36] CD/915, *Op. cit.*, p. 3.

[37] *Loc. cit.*

[38] For example, see "Letter dated 13 July 1989 from the Permanent Representative of the German Democratic Republic Addressed to the Secretary-General of the Conference on Disarmament Transmitting a Working Paper Entitled 'Survey of International Law Relevant to Immunity and Protection of Objects in Space and to Other Basic Principles of Outer Space Activities'," *Conference on Disarmament*, CD/933, 13 July 1989, p. 2.

so far held on definitions have been disappointing.[39] This, then, is one more reason why this Guide should examine the progress which has or has not been made in regard to the definition of terms.

a. Outer Space

It is not surprising - and perhaps might even have been expected - that the CD has not devoted much time to the definition of the concept of outer space. There is no universally agreed precise legal, technical or political definition of either the boundaries separating outer space from air space and deep space or of the term "outer space" itself, despite the fact that these topics have been under discussion in the COPOUS and its Legal and Scientific-Technical Sub-Committees for over two decades. However, it is also true that this has not prevented the completion of important international agreements such as the Outer Space Treaty and the USSR/US ABM Treaties, neither of which contains such definitions. Nevertheless, attention is often called to the lack of a precise definition of the term *space-based* in the latter agreement, precisely because an agreed definition of the boundaries of air space and outer space is lacking.

One question which could now be raised is whether the international agreements to be negotiated in the *Ad Hoc* PAROS Committee can afford to ignore this shortcoming. Yet another is whether it would be practical, desirable, and politically or otherwise feasible to reach a clear-cut definition and/or demarcation of outer space. These are not easy questions to answer, especially in view of the variety of weapon-specific systems (plus their operational interactions and similar civilian ground and space-based applications) that a treaty to prevent an arms race in outer space would doubtless contain. The technical difficulties should also be borne in mind. One of the major drawbacks to defining the boundary between air space and outer space is that it is difficult to obtain agreement on measurable physical parameters. Moreover, the boundaries between these two environments are not necessarily stable and may vary with time, changes in the atmosphere, and other physical phenomena. Although the adoption of an agreed definition and/or demarcation of outer space would not, in principle, affect existing agreements, it would be applicable only to future treaties and not be retroactive.

While no concrete proposals have been tabled on the definition and/or demarcation of outer space, some delegations have suggested that the COPUOS Legal Sub-Committee's discussions on the boundaries of outer space should serve as a basis for the CD talks. If this suggestion is adopted, discussions on the delimitation of outer space would be directed towards two basic definitions: a *spatial* and a *functional* definition.[40] In the case of the former, emphasis would be placed on the physical parameters leading to the demarcation of an altitude separating air space from outer space,[41] while in the latter the definition would be centred on the function of flying craft, whatever their altitude may be.[42] An arbitrary delimitation of air space and outer space may also be

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[39] CD/1034, *Op.cit.*, p. 7.

[40] See "The Question of the Definition and/or the Delimitation of Outer Space," *Official Records of the General Assembly*, A/AC.105/C 2/7, 7 May 1970; "The Question of the Definition and/or the Delimitation of Outer Space," *Official Records of the General Assembly*, A/AC.105/C 2/7, 21 January 1977.

[41] For a lengthy discussion of the different arguments on this approach, see A/AC.105/C.2/7, *Op. cit.*, pp. 98-161.

[42] For a discussion on this approach, see A/AC.105/C.2/7, *Op. cit.*, pp. 162-180.

examined. However, it is a matter of conjecture whether agreement on the definition of outer space can be reached without consensus on at least the principle of demarcation. Therefore, agreement on the boundaries of air space and outer space may well be followed by a definition of outer space.

Some delegations have also made proposals in other fora which are indicative of their views on demarcation and, presumably, on the forum they feel best suited to conduct negotiations. This is true, for example, of the Soviet Union which has presented a working paper to the COPOUS Legal Sub-Committee on the question. The Soviet Union not only supports a spacial approach, but has also suggested formalizing such a demarcation in a multilateral agreement, stating, inter alia, that "[t]he boundary between outer space and air space shall be established by agreement among States at an altitude not exceeding 110 km above the sea-level, and shall be legally confined by the conclusion of an international legal instrument of a binding character."[43]

The question of whether or not the definition and/or demarcation of outer space will be dealt in the CD remains open. So does the question of applicability to an eventual treaty on outer space. In this context, it is worth noting that UNIDIR has conducted a study on the peaceful and non-peaceful uses of space, in which it addresses the problems of definition for the prevention of an arms race in outer space. One important element brought out by this study was the need to define the boundary between air space and outer space within the context of a PAROS agreement.[44] Another interesting argument advanced by the UNIDIR study linked the definition of outer space to weapons-specific prohibitions, as follows:

> Any particular approach adopted may depend on the type of arms control measure being discussed. If, for example, a future treaty on the prevention of an arms race in outer space requires an accurate demarcation between air and outer space for operational reasons, an arbitrary decision would have to be taken regarding the exact position of this boundary. Based on pragmatic considerations, an altitude of 100 km above the earth's surface could be a logical choice for such a demarcation. However, such a boundary need not have universal applicability for other cases where there exists a difference in the legal regime between the air and outer space.[45]

Irrespective of whether the CD decides to debate this issue or not, any negotiations on the prevention of an arms race in outer space will most probably have to respond to the demands for weapons-specific prohibition and/or limitation and for reaching consensus on legally watertight agreements. Consequently, the approach quoted in the UNIDIR study provides an important impetus for these discussions.

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[43] "Matters relating to the Definition and/or Delimitation of Outer Space and Outer Space Activities, Bearing in Mind *Inter Alia*, Questions Related to the Geostationary Orbit," *Official Record of the General Assembly*, A/AC 105./C.2/L.139, 4 April 1983.

[44] For a discussion of the major elements related to the definition of the boundary between these two environments, see, for example, Caesar Voûte, "Boundaries in Space," in *Peaceful and Non-Peaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race,* UNIDIR, New York: Taylor & Francis, 1991.

[45] *Ibid.*, Bhupendra Jasani, "Introduction," I, Problems of Definitions, Where Does Outer Space Begin?, p. 19; for a discussion on the reasoning of this approach, see Voûte, *Op. cit.*, Chapter II. However, for the purpose of discussions on the PAROS, Voûte concludes that "[o]uter space is all of the space surrounding the Earth where objects can move in at least one full orbit around the Earth without artificial propulsion systems according to the laws of celestial mechanics, without being prevented from doing so by the frictional resistance of the Earth's atmosphere. It extends from an altitude above the earth of approximately 100 km upwards."

b. Uses of Outer Space

i. Peaceful Purposes and Peaceful Uses

Part of the CD's discussion is, of course, devoted to key terms such as *peaceful purposes* of space activities and *peaceful uses* of outer space, but consideration is in fact limited to an analysis of their relationship and not the military use of space. The two terms are used interchangeably but the different emphases given to them interweave and overlap in a mix of interest and nuance: *peaceful*, *aggressive*, *offensive*, and *defensive* uses of outer space. Interpretation can vary from *non-military* to *non-aggressive* purposes, or to a total ban of all *potentially aggressive* space objects. An analysis of their interpretation, or definition, can be rather confusing and therefore justifies a simplified explanation of these terms. A Canadian working paper on terminology dealt with this question very clearly, as summarized in Diagram A, which shows two fundamentally different interpretations of the term "peaceful".[46] In the first instance, peaceful purposes only prohibits the *aggressive* military use of outer space, while permitting *non-aggressive* use of that environment. As noted in a paper submitted by the Chilean delegation, this school of thought bases its argument on the legal difficulty of distinguishing "military" from "non-military" use of outer space.[47] Hence, those who support this view advocate that only a clearly discernible armed force should be prohibited, and in this connection Chile has proposed the following guideline for the definition of "peaceful uses of outer space":

> The concept of "peaceful uses" should be examined in the context of the evolution of contemporary international law and the principles which serve as a context for space law. Accordingly, only those activities which are not generally of a "non-peaceful" nature would be permissible in outer space and on the moon and other celestial bodies.[48]

In the second interpretation, however, "peaceful" means *non-military* use. For example, the Egyptian delegation does not interpret *peaceful purposes* as *non-aggressive* or as a variant of *military use of outer space*, but as a total ban on all non-peaceful uses of outer space.[49] The Indian delegation has explained the legal reasoning of those who support this view, recalling that, in the debates on the Outer Space Treaty, "[t]he negotiating record indicates that a great majority of delegates addressing this issue consider that the term 'peaceful' should be interpreted as 'non-military' and not merely in the narrow sense of 'non-aggressive'."[50]

While most delegations appear to believe that an agreement on measures aimed at confidence-building between States is feasible, the conclusion of a weapon-specific treaty, let alone a comprehensive PAROS treaty, may well prove to be a difficult task if there is no consensus on the interpretation of key terms on the basic uses of outer space.

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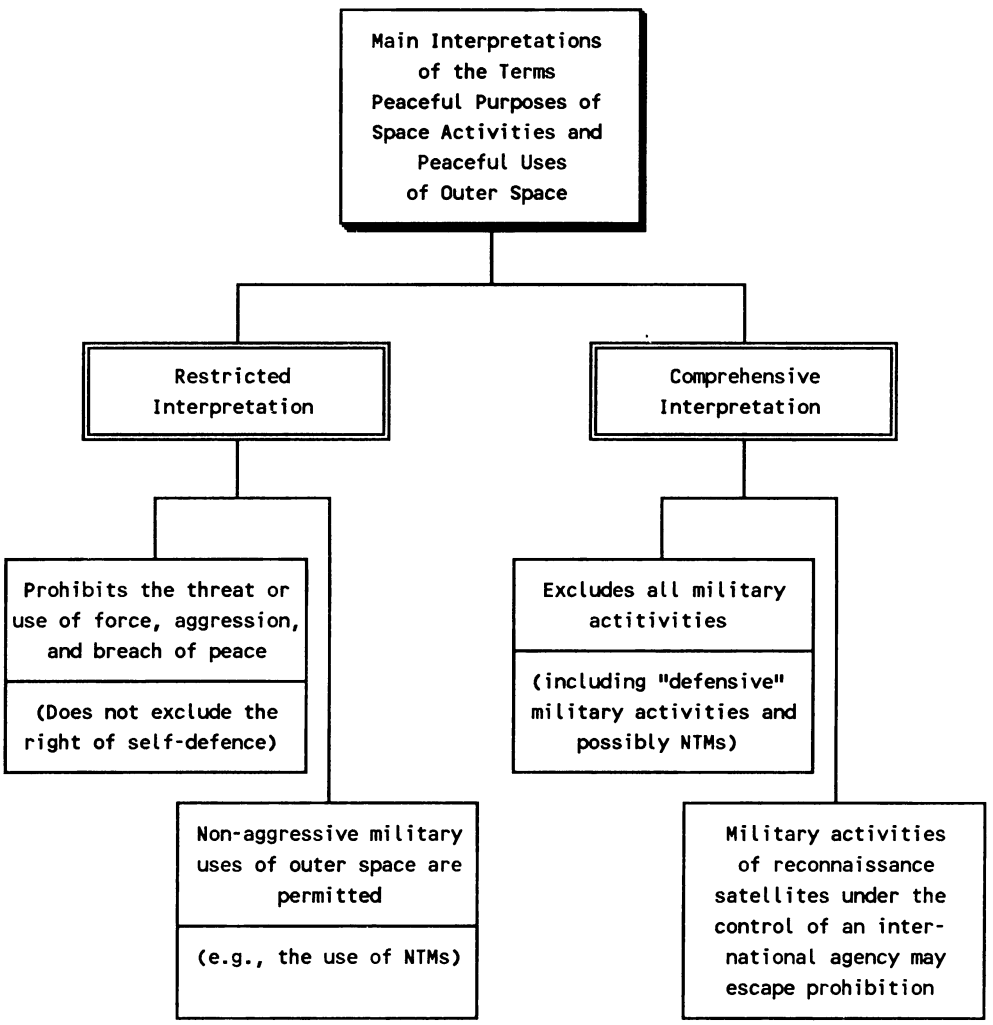
[46] CD/716, *Op. cit.*, pp. 8-14.
[47] CD/915, *Op. cit.*, p. 5.
[48] *Loc. cit.*
[49] CD/PV 550, *Op. cit.*, p. 15.
[50] CD/PV 529, *Op. cit.*, pp. 8-9; see also a discussion and references in CD/716, *Op. cit.*, pp. 12-13 (Canada).

DIAGRAM A



Source: Compiled from "Terminology Relevant to Arms Control and Outer Space," Working Paper submitted by Canada to the *Conference on Disarmament*, CD/716, 16 July 1986 and various other CD sources.

ii. Weaponization and Militarization

Weaponization and militarization of outer space are two other terms which are often ambiguously used in CD debates.[51] However, the term *weaponization of outer space* is generally understood to incorporate the introduction of weapons into the outer space environment. In this general definition, weaponization equates to the placement of weapons in outer space. The term *weaponization of outer space* has been used to include space-based weapons consisting of space/Earth-strike devices. For some delegations, however, *weaponization of outer space* also covers ground-based weapons consisting of space-strike devices. For example, the inverse of weaponization - de-weaponization - has been employed by China to mean "...banning the development, testing, production, deployment, and use of any space weapons and the thorough destruction of all space weapons".[52] This position therefore assumes that some measure of *weaponization of outer space* has already begun, since certain ASAT weapons have already been developed and tested, although no space weapons have yet been permanently stationed in outer space. In addition, it appears that, for China, a definition of *weaponization of outer space* would also include the development, testing and production of space weapons. Apparently, for China (as well as for several other countries), *weaponization of outer space* does not include other space-related devices, such as space-transit weapons consisting of Earth-strike devices. Nor, it seems, would a definition of the *weaponization of outer space* include observation, early-warning, and other satellites - regardless of their use as Command, Control, and Communications (C^3) for military operations or for monitoring or verification of arms limitation and disarmament.

In the case of *militarization of outer space*, a generic definition of this term would mean any use of outer space for military purposes. Unlike weaponization, this definition implies that outer space may or may not contain the weapons as such, and that any space object which is part of a larger system performing a given military assignment would constitute *militarization of outer space*. Thus, satellites or any other space vehicles used in support of military operations would fall within that category and this has, not surprisingly, been argued by many delegations at the CD. Nevertheless, the term "militarization" has also been interpreted to mean "weaponization" as may be seen from a USSR statement which advocated that the international community should take measures to prevent the *militarization of outer space* "...before weapons penetrate into outer space".[53] Here, the collective perception of outer space as a militarized environment is not very clear. Indeed, there are some delegations which believe that

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[51] For a short discussion - and references - on the use of these terms, see CD/716, *Op. cit.*, p. 5 (Canada).

[52] "China's Basic Position on the Prevention of an Arms Race in Outer Space," Working Paper submitted by China to the *Conference on Disarmament*, CD/579, 19 March 1985, p. 1.

[53] "Letter Dated 21 August 1985 Addressed to the President of the Conference on Disarmament by the Representative of the Union of Soviet Socialist Republics transmitting the Texts of Documents Connected with the USSR Proposal 'The Basic Directions and Principles of International Co-operation in the Peaceful Exploration of Outer Space under Conditions of Its Non-Militarization'," submitted by the USSR to the Conference on Disarmament," *Conference on Disarmament*, CD/639, 21 August 1985. In another document, the Soviet Union also stated that "...the militarization of outer space ... would begin with the launching into space of offensive weapons designed to destroy objects in space and from space in the atmosphere or on Earth, or with the deployment of weapons designed to destroy space objects." See "Statement submitted by the Union of Soviet Socialist Republics to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 320, 11 July 1985, p. 18; see also "Statement submitted by the German Democratic Republic to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 303, 28 March 1985, p. 20; and "Statement of the Group of 21," submitted to the Conference on Disarmament," *Conference on Disarmament*, CD/513, 29 June 1984.

militarization of outer space would result from the introduction of weapons into that environment, and not necessarily through the military use of satellites as we know it today.

A contrary interpretation of *militarization of outer space* has been used to mean military use of that environment of any kind. For example, China has stated that "...the 'non-militarization of outer space' requires [that] both space weapons with actual lethal or destructive power and military satellites of all types be limited and prohibited".[54] This statement goes on to argue that priority should be given to the de-weaponization of outer space and that, given their complexities, the limitations and prohibitions of military satellites should be resolved at a later stage. In this example, non-militarization which, in principle, is a preventive act, is in fact conditioned by de-weaponization, which is not a preventive act but denotes the elimination of existing weapons. The French, however, have used the term "de-militarization" to mean the elimination of both weapons and other space-based objects performing military functions. In the French view,[55] while there should be limitations on ABM technology, it would be unrealistic to set the complete de-militarization of outer space as an objective. France has therefore suggested that any military activities contributing to strategic stability which can assist in the monitoring of disarmament agreements should not be affected.

c. Space Weapons

Central to the CD's discussions is the definition of a *space weapon* and its components. ASAT weapons and their systems are a particular case in point, their definition having been discussed by the CD well before the establishment of the *Ad Hoc* PAROS Committee in 1985. For example, in 1982, the Italian delegation raised a number of pertinent questions concerning the characteristics of these weapons, as well as the scope of any possible ASAT definition.[56] In the Italian view, it is not enough to know what constitutes an ASAT system; it is also important to know how widely the term "ASAT system" could be construed. The difficulty has been to ascertain whether it should only encompass weapons specifically designed to damage or destroy satellites and their components, or whether it should also comprise any weapon constructed and deployed for an ASAT role, or tested in an ASAT mode. Moreover, the question also remains open as to whether it would be possible, or even desirable, to identify the various types of ASAT systems. Apart from the question of defining ASAT weapons from the standpoint of hardware, the Italian delegation has also expressed concern about an exact definition of ASAT activities. For example, would interference with the operation of a satellite - say, jamming it electronically, blinding it with lasers[57] or moving it from its orbit (if that were feasible) - be considered an integral part of an ASAT weapon definition?

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[54] CD/579, *Op. cit.*, p. 1.

[55] See "Statement submitted by France to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 263, 12 June 1984, p. 21; for a similar discussion of the term "militarization", see also "Statement made by Sri Lanka to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 404, 9 April 1987, p. 11.

[56] "Statement submitted by Italy to the Committee on Disarmament," *Committee on Disarmament*, CD/PV 167, 30 March 1982, pp. 34-35.

[57] Laser [Light Amplification by Stimulated Emission of Radiation] is a beam of coherent electromagnetic radiation.

In 1986, the Venezuelan delegation placed a proposal before the Committee which set forth some of the essential factors for the definition and identification of space strike weapons (see Table I).[58] The first observation to be made about the Venezuelan paper is that, by using the one and same heading of "nature" to describe both defensive and offensive space devices, the proposal covers a wide spectrum of devices. Thus, the

TABLE I

DRAFT DEFINITION OF SPACE STRIKE WEAPONS PROPOSED BY VENEZUELA - 1986

Main factors to take into account	Definition
• Nature	- Offensive and defensive purposes.
• Place of deployment	- In outer space, within the atmosphere, in the air, in water, or on land.
• Location of the target	In outer space.
• Scientific Principle (Functioning of the weapon)	- Conventionally armed; Nuclear armed; - Other mass destruction weapons; - "Exotic" technology armed: high-energy laser beams, microwaves; particle beams, electron beams, kinetic energy, etc...
• Anti-satellite (ASAT) weapons	Weapons exclusively intended to destroy or damage targets located in outer space. Deployed in any of the conceivable environments.
• Anti-ballistic missile (ABM) weapons	Exo-atmospheric/Endo-atmospheric interceptors deployed in any of the conceivable environments.¶

¶= The proposal's wording does not make it clear whether endo-atmospheric interceptors are excluded. However, endo-atmospheric interceptors incapable of destroying or damaging targets in outer space would presumably be excluded from the definition.

Source: Compiled from "Space Strike Weapons," Working Paper submitted by Venezuela to the *Conference on Disarmament*, CD/709/Rev.1, 22 July 1986.

proposed definition avoids the controversial issue of drawing a distinction between the different types of use of space devices. In this instance, the definition of space weapons is based on the technical characteristics and destructive power capability of a given device, and not on its military action or purpose. This approach has received support in the CD, as may be seen from a statement by the Peruvian delegation, which emphasized

[58] "Space Strike Weapons," Working Paper submitted by Venezuela to the *Conference on Disarmament*, CD/709/Rev.1, 22 July 1986. For other Venezuelan proposals on the definition of space weapons, see "Letter Dated 31 March 1989 Addressed to the Secretary-General of the Conference on Disarmament from the Permanent Mission of Venezuela Transmitting a List of Existing Proposals on the Prevention of an Arms Race in Outer Space," submitted to the *Conference on Disarmament*, CD/908, 31 March 1989.

that "...what is important in a weapon is not so much the space or area in which it operates as its function and effect which characterize it as such, in addition to an always hostile intent."[59]

The second important aspect of the Venezuelan proposal is that it does not limit the main factors of the definition to space-to-space devices, but it extends the possible places of deployment to other modes, including ground-based and air-launched devices, which would presumably cover ASAT and ABM systems intended to destroy or damage targets in outer space. Here, however, the Venezuelan proposal presented a handicap by limiting the location of the weapons' target to objects situated in outer space. It failed to take into consideration the notion advanced by China in 1985 that a definition of space weapons should include, *inter alia*, "...all devices or installations based in space (including those based on the moon and other celestial bodies) which are designed to attack or damage objects in the atmosphere, or on land, or at sea...".[60] As for the distinction between ASAT and ABM weapons, the latter would apparently not be defined as space weapons if their capability is limited to that of endo-atmospheric interceptors incapable of striking objects in outer space. The proposed definition takes existing ASAT weapons modes into consideration as well as future ASAT capability by including devices which function under both kinetic and directed-energy kill principles.[61]

Despite the numerous factors proposed for the definition, the 1986 draft did not cover all the relevant elements of the issue, but in 1988 Venezuela tabled a proposed amendment to Article 1 of the Outer Space Treaty which contained a revised version of its draft definition of space weapons and their scope of operation.[62] The innovative aspects of this new proposal focus on two important factors. The first one is that space-based weapons capable of conducting space-to-Earth (including air, ground, and sea) attacks are included, as had already been proposed by China, Sri Lanka, and the Soviet Union in the *Ad Hoc* PAROS Committee. The second is that specific reference is made to both the components of space weapons and the weapon systems themselves. The draft definition reads as follows:

> ...space weapons are understood to mean any offensive or defensive device, including its operational components, whatever the scientific principle on which its functioning is based:
>
> (a) Capable of destroying or damaging from its place of development in outer space an object situated in outer space, in the air, in water or on land;
>
> (b) Capable of destroying or damaging from its place of deployment in the air, in water or on land an object situated in outer space.
>
> The following are also space weapons: any offensive or defensive device, including its operational components, and any system of such devices, whatever the scientific principle on which its functioning is based, that is capable of intercepting, from outer space or from land, water or the atmosphere, ballistic projectiles during their flight.

The 1988 proposal therefore contains a comprehensive definition of *dedicated space weapons*, i.e., weapons specifically designed to strike targets in and from space. However, in placing the emphasis on the term "capable", the proposal presumably also

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[59] CD/PV. 472, *Op. cit.*, p. 7.
[60] CD/579, *Op. cit.*, p. 1.
[61] For a discussion on kinetic and directed-energy weapons principles, see *Infra*, Part I, Chapter I, B, 3, b.
[62] CD/851, *Op. cit.*.

implicitly covers some, if not all, of the ASAT activities of non-dedicated space weapons. (Non-dedicated space weapons are weapons and weapon systems which, while not space weapons as such, have some inherent capability which could convert them into space weapons.)[63] It is worth recalling here that the UNIDIR study mentioned earlier also proposed a definition of a space weapon, as follows:

> A space weapon is a device stationed in outer space (including the Moon and other celestial bodies) or in the earth environment designed to destroy, damage or otherwise interfere with the normal functioning of an object or being in outer space, or a device stationed in outer space designed to destroy, damage or otherwise interfere with the normal functioning of an object or being in the earth environment. Any other device with the inherent capability to be used as defined above will be considered as a space weapon.[64]

As will be noted, this definition covers dedicated and non-dedicated space weapons, but in the case of ASAT weapons it is obvious that much more specific clarification is required. In 1989, the then German Democratic Republic submitted a working paper to the CD, presenting the most comprehensive analysis to date of the major elements to be considered in defining specific space weapons and their components, and endorsing the idea of creating a group of scientific experts to prepare such definitions.[65]

However, that working paper was limited to an analysis of the so-called *conventional* space weapons, although the general definition of ASAT weapons it proposed widened the definitions presented by Venezuela in that it also took account of the concern expressed in 1982 by Italy with regard to interference with space objects other than destruction or damage. The new definition - which was also proposed to the *Ad Hoc* PAROS Committee by Bulgaria, China, Hungary, and Sri Lanka - reads as follows: "...any device or installation based entirely or partially on land, sea, in the air and/or in outer space which is specifically designed and intended to destroy, damage or interfere with the normal functioning of space objects."[66] Tables II and III detail the major elements proposed for the definition of ASAT weapons, their components, and systems in two main categories: (a) Chemical Rockets and Mass Accelerators and (b) Space Mines and Collision Bodies. Chemical rockets and mass accelerators are further divided into space-based and ground-based devices. The GDR working paper covers various ASAT weapons which have already been tested, as well as ASAT capability which is still in the laboratory stage. Chemical rockets are thought not to exist - even though fully within the realm of current technology - while it is said that mass accelerators and mass drivers in the form of rail guns are in the laboratory development stage, and ground-based direct ascending missiles in a far advanced development stage,

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[63] It should be noted, however, that neither of these proposals made specific reference to the suggestion put forward by China in 1985 to the effect that a definition of space weapons should also include the concept of disruption to the normal functioning of objects in outer space. See CD/579, *Op. cit.*, p. 1.

[64] Jasani (ed.), *Peaceful and Non-Peaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race, Op. cit.*, p. 24.

[65] "ASAT Components and Ways of Verifying Their Prohibition," Working Paper submitted by German Democratic Republic to the *Conference on Disarmament*," CD/927, 26 June 1989.

[66] *Ibid.*, p. 1.

TABLE II

CHEMICAL ROCKETS AND MASS ACCELERATORS

Description	Space-Based		Ground-Based	
	Chemical Rockets	Mass Accelerators	Direct Ascending Missiles	Mass Drivers (Rail Guns)
• General characteristics	- Assemblies of small rockets.	- Mass drivers (rail guns) on space platforms.	- Ground-launched, sea-launched, or air-launched direct ascending missiles to destroy space objects by direct collision, explosion or projectile emission.	- Electromagnetic mass drivers (rail guns) using small masses as projectiles.
• Kind of space weapon or component	- Small devices (launching bodies) to be launched by rockets from space platforms to destroy other objects in space. Part of a comprehensive system installed in assemblies on steerable platforms, including detection, communications and guiding components.	- Electromagnetic mass drivers (rail guns) on space platforms using small masses as projectiles. Accelerating a small mass of a few grammes in an electromagnetic field. The size of the linear accelerator is of the order of meters.	- For altitudes up to 1,000 km: ground or air-launched carriers; For higher altitudes: large ground-launched rockets carrying homing devices.	- Size of linear accelerator of the order of meters.

TABLE III

SPACE MINES AND COLLISION BODIES

Description	Space Mines	Manoeuvrable Collision Bodies	Forming Clouds of Small Collision Bodies
• General characteristics	- Devices which manoeuvre close to a target spacecraft and explode on command, destroying the target with the debris from the explosion.	- Space objects placed in orbit which are capable of changing their position and approaching other space objects at high speed.	- Clouds formed by a large number of small collision bodies (metal pellets).
• Kind of space weapon or component	- Space-based devices functioning with support from ground-based and space-based tracking systems, and on-board homing devices.	- Incorporates some features of space mines and some features of a space-based or ground-based collision device. A high degree of manoeuvrability and a precise homing device.	- Spacecraft capable of emitting a large number of metal pellets which would be directed towards a target space object in form of a narrow beam or by spreading over a large area and which would cause damage by collision.

Source: Compiled from "ASAT Components and Ways of Verifying Their Prohibition," Working Paper submitted by German Democratic Republic to the Conference on Disarmament, *Conference on Disarmament*, CD/927, 26 June 1989.

tests of ASAT, ABM and ATBM [Anti-Tactical Ballistic Missile] devices having already been carried out.

The foregoing examples show how the key terms *peaceful uses*, *weaponization*, *militarization*, and space weapons (including their variations) have been employed, and the diverse use made of these terms partly explains the lack of agreement in the CD on the measures to be taken to prevent an arms race in outer space, and in what sequence. Therefore, a joint understanding of the meaning of these terms would be a constructive step not only towards clarity in discussion, but also in harmonizing the objectives and priorities sought by the various delegations to the CD. This goal could be achieved by an appraisal of the common uses of these terms, and a 1988 Canadian working paper on the uses of terms relating to the PAROS has been most useful in this respect. An in-depth analysis of the definition of such terms could well lead to the formulation of a collective description of what constitutes the military use of outer space and its relation to space weapons and military activities in that environment, a description which must surely be a *sine qua non* for the foundation of any solid agreement on space weapons and military and military-related activities in outer space.

2. Ballistic Missile Technology

Of the many issues of direct or indirect interest to the PAROS, a few call for special attention for the easier understanding of the relationship between weapons and outer space. *Ballistic Missile Technology* is one of these issues. This type of technology is often brought up at the CD and is in fact the subject of one of the major arms limitation and disarmament agreements presently in force. The purpose here, therefore, is to explain the principal output of ballistic missile technology and its relevance to the present guide.

This technology[67] involves a vehicle which is propelled into outer space by rocket engines. During its propulsion, smaller portions of the missile, re-entry vehicles, detach themselves from the vehicle and start a free-fall to reach the ground or sea-level target via the attraction of gravitational forces. Figure 1 shows a typical flight trajectory of BMs and the basing modes. The range covered by this type of earth-to-earth ballistic trajectory missile may vary from intermediate (1.000-5.500 km) to intercontinental range (more than 5.500 km). These missiles exist in different basing modes: fixed and mobile - Intermediate-Range Ballistic Missile (IRBM) and Intercontinental Ballistic Missile (ICBM) -and sea-launched, Sea-Launched Ballistic Missile (SLBM). However, what is important to note here, and illustrated by the endo-atmospheric and exo-atmospheric flight stages in Figure 1, is that a considerable portion of the missile's flight time - estimated in some cases as being up to 80 % of it - takes place in outer space and not within the atmosphere. The flight trajectory of BMs can be divided into four phases. The first one, known as the boost phase, usually lasts 3-5 minutes if the missile is powered into space to altitudes up to 1200 km[68] and re-entry vehicles are dispensed. The remaining phases may take up to 25 or 30 minutes' flight-time if the post-boost, midcourse, and a portion of the terminal phases are also to take place in outer space. For all that, BMs designed and operated to perform ground/sea-to-ground/sea strikes are nevertheless not generally recognized as being space weapons as such.

If BMs are not usually included within the general definition of space weapons, why are they relevant to the PAROS discussions? The answer is threefold and based on the premise that BM technology plays an important role in present and potential military uses of outer space.

First, current BM technology is being used by the major powers in intercontinental and intermediate range vehicles, which means that it has relevance to the PAROS in two ways. One is that the quest to develop defence against BMs based on new technology will involve space-based interceptors to counter such missiles within the atmosphere and in outer space during the boost, post-boost, midcourse, or terminal phases. Given the proposed definitions of space weapons both at the CD and in the academic literature, any modification of BMs' inherent role from a ground/sea-to-ground/sea into a ground/sea-to-space operating mode would affect the general belief that they are not space weapons. As for the second aspect, BM technology will probably constitute

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[67] For a longer and more technical discussion on BMs, see "Ballistic Missile Defense: Then and Now," U.S. Congress, Office of Technology Assessment, OTA-ISC-254, Washington D.C.: U.S. Government Printing Office, September 1985; Ashton B. Carter, David N. Schwartz, *Ballistic Missile Defense*, Washington, D.C.: Brookings, 1984.

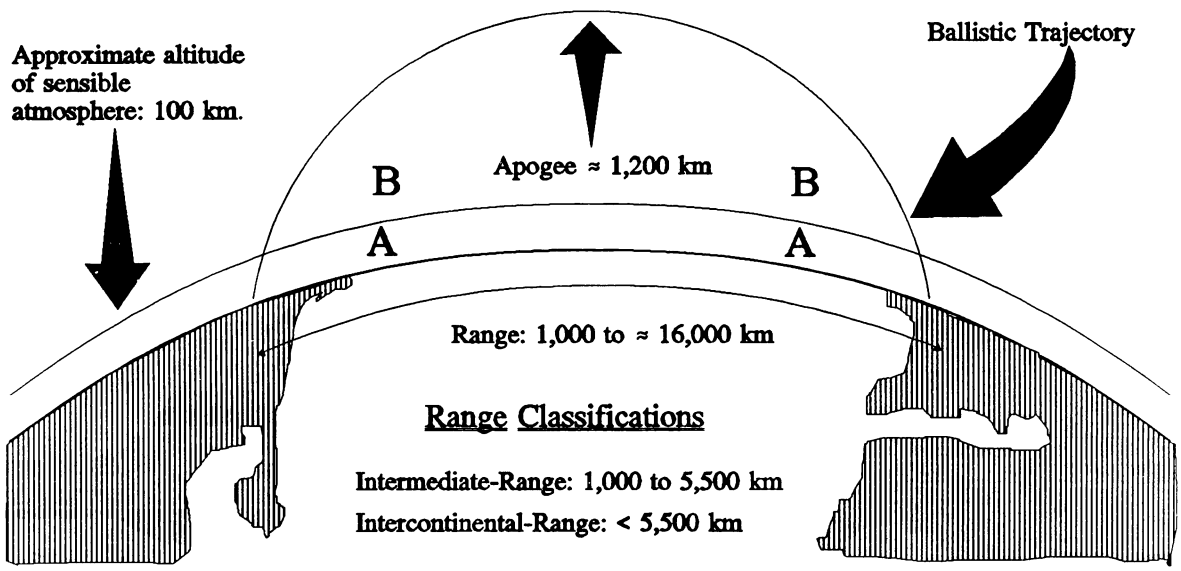
[68] For a discussion on the definition of outer space, see *supra*, Part I, Chapter I, B, 1, a; and a study undertaken by UNIDIR entitled *Peaceful and Non-Peaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race, Op. cit.*

Figure 1

Ballistic Missile Flight Trajectory and Basing-Modes

Flight Stages

- A - Endo-Atmospheric Stage (Air Space)
  - Boost Phase;
  - Terminal Phase.
- B - Exo-Atmospheric Stage (Outer Space)
  - Boost Phase;
  - Post-Boost Phase;
  - Midcourse Phase;
  - Terminal Phase.



¶ Air-to-Surface Ballistic Missiles (ASBM), launched from a bomber and capable of a range greater than 600 km, have not been deployed to date.

the first technology basis of KE space strike interceptors in the next few decades. It is therefore only by having a deeper understanding of the various offensive and defensive military functions of ballistic vehicles that negotiators will be able to set prohibitions and limits in the uses of outer space that are both militarily and technically viable.

Second, R&D on BM technology used in civilian space launch programmes through the development of orbital and suborbital sounding rockets is, in many respects, similar to military rocket technology. This is the so-called dual capability of ballistic trajectory rocket systems, where some of the developments in civil launching vehicles, guidance systems, and other component parts of BM technology for placing satellites and other orbiting devices into space are also applicable for, and in many cases have derived from, military-oriented programmes.[69] The point has also been made in the *Ad Hoc* Committee that "...the increasing number of countries becoming involved in space activities make the consideration of the item in the Conference on Disarmament even more relevant."[70] For example, the Argentinian delegation has stated that the growth in the number of States acquiring the technology necessary to gain access to space - directly or indirectly - gives a sense of reality to the efforts made at the Committee.[71] This dual-capability of BM technology is thus a concern which is expressed in the *Ad Hoc* PAROS Committee in the form of proposals to set up a network of confidence-building measures, in order to achieve a higher degree of transparency in space activities.

Third, although BMs are technically difficult to construct and maintain, and very expensive to purchase, BM technology is spreading to countries which are not normally considered as major powers.[72] Thus, over 20 developing countries now have ballistic missiles or ballistic missile programmes as a result of either technical and financial assistance from industrialized or developing countries or indigenously acquired knowhow.[73] In consequence, several delegations to the CD and the *Ad Hoc* PAROS Committee have made proposals to multilateralize the legal régime established by the bilateral ABM Treaty.[74] This would limit the military aspects of BM technology, and include a ban on ASAT weapons which would affect both industrialized and developing countries whether they have BM technology or not.

Nevertheless, today's BM technology can hardly be called a *technological innovation*. After all, its military application was first test-validated in the late 1950s and early 1960s. However, depending on its application and use, BM technology could be an integral part of an arms race in outer space, and it has even been argued that it constitutes the cornerstone for the development of space weapons in the near future, which explains why some delegations - for example, Sri Lanka - have wondered whether

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[69] See an article by S. Chandrashekar in "Missile Technology Control and Third World," *Space Policy*, No. 6, November, 1990, pp. 278-84.

[70] CD/1034, *po. cit.*, p. 6.

[71] "Statement made by Argentina to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 547, 29 March 1990, p. 13.

[72] For a discussion on the spread of BM technology, see "Missile Proliferation: The Need for Controls (Missile Technology Control Regime)," Hearing before the Subcommittees on Arms Control, International Security and Science, and on International Economic Policy and Trade of the Committee on Foreign Affairs, House of Representatives, One Hundred, First Congress, July 12, October 30 1989, Washington, D.C.: Committee on Foreign Affairs, House of Representatives, 1990; W. Seth Carus, "Missile in the Middle East: A New Threat to Stability," *Policy Focus*, No. 6, June 1988; Also see Aaron Karp, "Ballistic missile proliferation", *SIPRI Yearbook 1990 - World Armaments and Disarmament*, Oxford: Oxford University Press, pp. 368-391.

[73] *Loc. cit.*

[74] For example, see "Proposal relating to the Prevention of an Arms Race in Outer Space, International Instrument to Supplement the ABM Treaty," submitted by Pakistan to the *Conference on Disarmament*, CD/708, 26 June 1986.

the fact that ICBMs can travel through outer space during their flight trajectory makes them a space weapon?[75]

Accordingly, what kind of military activities have so far taken place in outer space? And what type of weapons have been or are expected to be developed, particularly those which the CD is presently considering in its quest to prevent an arms race in outer space?

3. Developments in Military Uses of Outer Space

There have been so many developments in military space-related activities, R&D on weapons specifically designed to strike objects in outer space, and non-dedicated space weapons in the past 30-40 years that knowledge of the impact of present and foreseeable military activities is a prerequisite to the formulation of any international law to prevent an arms race in outer space. Thus, the Italian delegation asked the CD to initiate an assessment of the activities then taking place in outer space and the scientific and technological developments which were liable to threaten the peaceful use of that environment.[76] It is not this guide's purpose to make a comprehensive review of military activity and the use of space weapons in outer space[77] but, to clarify the objectives of agenda item 5 of the CD, it is felt that some consideration should be given here to the various types of military space activity presently under way and the latest developments in dedicated space weapons and weapon systems.

Although the range of military operations in outer space is obviously extremely wide, there are nevertheless two areas of activity which make it possible to estimate the present and potential use of outer space.[78] One uses satellites as an auxiliary tool for the support and improvement of military operations on the ground, in the air, at sea, and in outer space. The other area actually uses space weapons to strike or interfere with a given target in any of the same four environments. While the following section discusses the military use of satellites, other potential military activities in space (such as orbiting, air-launched, and ground-based space weapons) are given special attention in a subsequent section.

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[75] CD/404, *Op. cit.*, p. 13.

[76] CD/PV 167, *Op. cit.*, p. 32.

[77] Several articles and books have considered the technical aspects of military space weapons and the military use of outer space in considerable detail - for example, *Ballistic Missile Defence, Op. cit.*; Paul Stares' article entitled "US and Soviet Military Space Programs: A Comparative Assessment," *Weapons in Space*, Franklin A. Long, Donald Hafner, and Jeffrey Boutwell (ed.), New York: W. W. Norton & Company, 1986, pp. 127-45; *Outer Space: Battlefield of the Future?*, London: Taylor & Francis, 1978; Bhupendra Jasani, *Space and International Security*, Whitehall: Royal United Services Institute for Defence Studies, 1987.

[78] The discussion here is concerned with the so-called *passive* (or non-aggressive) and *active* (or aggressive) uses of space objects, whether for offensive or defensive military operations. For example, the term "passive satellite" is used to describe the use of a satellite fulfilling the role of an auxiliary tool for military activities as well as civilian-oriented needs - e.g, gathering information and improving communications. However, an "active" use of a space object is used to define the role of space weapons, such as killer satellites or ASAT weapons. For further discussion related aspects of military satellites, see "Statement submitted by Sweden to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 252, 22 March 1984, pp. 15-20; Stares, "US and Soviet Military Space Programs: A Comparative Assessment," *Op. cit.*, pp. 127-45.

a. Military Activities in Outer Space

In any analysis of military activity, it is important to summarize the main areas of concentration, the applications, and the operational constraints. Accordingly, Table IV identifies a number of military space applications based on the utilization of remote-sensing and communication techniques. (It should be noted that the table is not intended to be comprehensive and concerns only the activities which are often singled out in the CD because of their strategic or tactical military importance.)[79] Military support space activities have at least three main applications: the first (and not necessarily in this order) is to detect and/or identify the movement and position of troops and their equipment; the second is to conduct and/or hinder military communications; and the third to collect data on weather and other atmospheric conditions in order to optimize the performance of weapons and military missions. These applications may require different types of satellites whose characteristics are conditioned by a number of geophysical laws in and above the atmosphere, as well as space technology. Thus, a number of major elements have to be considered when assessing a satellite's orbit and on-board instruments for a particular military application and, as Table IV shows, military activities in outer space are multifarious not only in regard to quantitative mission applications, but also in regard to the utilization of different orbital planes around the Earth.[80] Moreover, some of these applications could also be so designed that the satellites' field of vision would be oriented to perform space-to-space and space-to-earth operations.[81]

That the military satellite function most discussed in the CD is the one performed by reconnaissance satellites is almost certainly because it calls on a number of vital applications which support modern army operations. However, it is also due to the perception that some delegations have of the role that some of these space-based devices are presently playing and may be attributed in the future - for example, the monitoring of arms limitation and disarmament agreements and other questions related to the

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[79] See, for example, "Statement submitted by Nigeria to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 152, 9 February 1982, pp. 37-38; "Statement submitted by Union of Soviet Socialist Republics to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 164, 18 March 1982, pp. 17-19; "Statement submitted by Sri Lanka to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 183, 31 August 1982, pp. 15-17; "Statement submitted by China to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 423, 21 July 1987; "Statement submitted by India to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 423, 21 July 1987; "Statement submitted by India to the *Conference on Disarmament*," CD/PV 450, 22 March 1987, p. 12; "Statement submitted by Czechoslovakia to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 253, 17 March 1984, pp. 8-11; "Statement submitted by the United States of America to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 300, 19 March 1985, pp. 22-28; "Statement submitted by Sweden to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 301, 21 March 1985, pp. 16-19; "Statement submitted by France to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 303, 28 March 1985, pp. 14-16; "Statement submitted by the United States of America to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 321, 6 July 1985, p. 9; "Statement submitted by the United States of America to the *Conference on Disarmament*," CD/PV 349, 20 March 1986, pp. 10-14; "Statement submitted by Sri Lanka to the *Conference on Disarmament*," CD/PV 354, 8 April 1986, p. 7.

[80] For a discussion on orbital planes, see *Satellite Warfare: A Challenge for the International Community, Op. cit.*, pp. 7-11.

[81] The present discussion deals only with the space segment of space activity. However, there are other ground-based systems which are relevant to space observation. One of these is the GEODSS [Ground-Based Electro-Optical Deep Space Surveillance] used by the US Air Force for the observation of, *inter alia*, low-altitude reconnaissance satellites and to monitor infra-red emission from satellites. Key GEODSS components include telescopes (equipped with intensified silicon target video sensors), cameras, and digital computers. For further discussion on such systems, see Rutkowski, Chris A., "The Role of Astronomical Instruments in Arms Control Verification", *Arms Control Verification Studies*, No. 2, Department of External Affairs: Ottawa, 1986, pp. 4-6; Paul B. Stares, *Space and National Security*, Washington, D.C.: The Brookings Institution, 1987. For a short but interesting article on GEODSS, see Smith, Bruce A, "Ground-Based Electro-Optical Deep Space", *Aviation Week & Space Technology*, August 27, 1979, pp. 48-53; see also Beatty, J. K., "The GEODSS Difference", *Sky and Telescope*, V. 63, No. 5, pp. 469-473.

TABLE IV

BASIC MILITARY USE OF REMOTE-SENSING AND COMMUNICATIONS (SPACE SEGMENT)¶

Assignment	Altitude/ Inclination	Orbit	On Board Sensors	Principal Application
• General Reconnaissance	-300-1200 km -100°	-iv	-Special ELINT devices, Pgc.	-Area surveillance and close-look (photographic image in real time in digital form), Bomb Damage Assessment.
• Nuclear/Chemical Material Reconnaissance	-550, 20000 km -63°	-v	-Pgc, Mw radars, Ms scanners, Nuclear and Chemical sensors.	-Detect emission spectra from nuclear radiation or chemical elements both in space and in the earth's atmosphere.
• Photographic or Electronic Reconnaissance	-500-1400 km	-ii	-Special ELINT devices.	-Photographic image; monitor military radio communications, missile telemetry-radio signals, and naval vessels.
• Ocean surveillance (using multiple satellite techniques)	-250, 650 km -63°	-v	-Special ELINT devices, Pgc, radars.	-Locate surface ships: determine their nature and direction. Satellites using *passive sensors* can also detect IR and MW radiations, submarine missile launching and detection.
• Early-Warning	-36000 km -0°, 63°	-i, vi	-Infra-red sensors	-Detect the heat of rocket plume to monitor the launching of ballistic missiles.
• Geodetic	-800 km -100°	-	-	-Determine the earth's gravitational field, well-detailed maps and the location on the globe of cities, towns and villages to improve the accuracy of intercontinental or cruse missiles.
• Navigation	-§, 20000 km -63°	-§, v	-	-Atmospheric measurements to determine optimal missile trajectory (e.g., water vapour content and wind velocity along a missile's possible trajectory).
• Meteorology	-500-1000 km -100°	-iv	-Pgc, infra-red sensors	-Supply real time global and local visibility and IR images (weather conditions).
• Telecommunications	-36000 km -0°, 63°	-i, vi	-Receivers	-Military telecommunications.

¶= Altitude and orbit are illustrative and represent ranges of satellites already launched; §= The nature of these satellites is such that their location and trajectory are manoeuvrable. **Orbital Parameters:** i= geosynchronous; ii= sun-synchronous polar; iii=circular polar; iv= heliosyncronous; v= circular 12 H; vi= Elliptical 12 H or molniya. **Observation Sensors:** IR= infra-red, Mw= microwave, NRD= nuclear radiation detector, TIR= thermal infra-red; Pgc= Photographic camera; Ms= Multispectral; ELINT= Electronic Intelligence; ELINT Devices= Infra-red sensors, radars, etc...

Source: Data complied by the author partly in the light of information given in "The Implications of Establishing an International Satellite Monitoring Agency", Department of Disarmament Affairs - Report of the Secretary-General, United Nations, New York, 1983; *Space Weapons: The Arms Control Dilemma*. Bhupendra Jasani (ed.). London: Taylor & Francis, 1984; Bhupendra Jasani, *Space and International Security*, Whitehall: Royal United Services Institute for Defence Studies, 1987, and others.

maintenance of international security.[82] One particular function which has a multiple field of vision is that of the satellite equipped with radioactive material sensors and designed to detect the presence and monitor the movement of nuclear material on the ground as well as in outer space - which is sometimes referred to as the Non-Proliferation Satellite (NPS).[83] Another important military function is played by ocean surveillance satellites. For instance, Soviet radar technology-based RORSATs (Active Radar Ocean Reconnaissance Satellites) placed in a circular orbit and the EORSATs (ELINT Ocean Reconnaissance Satellites) at an altitude of approximately 250 km fulfil very specific military functions by tracking the location of and listening to US battleships.[84] Among US satellites, the NOSSs [Navy Ocean Surveillance Satellites] observe the Soviet naval fleet and the GLOM [Global Low Orbiting - Message Relay] and the ITSS [Tactical Integration of Satellite Systems] both carry out ocean surveillance.

Among other military functions attributed to satellites which have not escaped attention at the CD are various wartime combat functions[85] in which satellites play a significant strategic role - for instance, monitoring broad ocean and geographic areas in real and almost real-time combat operations. One recent example was the US Defense Support Program (DSP) in the Arabian/Persian Gulf which consisted of ground and space-based segments.[86] The space segment has satellites in a geostationary or geosynchronous orbit, and polar orbits providing information on missile launch sites and force deployments which is transmitted to the ground segment. This type of information, which is sometimes recorded on digital maps on-board, was further relayed to the US military commander in Saudi Arabia and even to the actual theatre of operations. For example, Lacrosse spacecraft carrying infra-red telescopes were used for the early detection of Iraqi mobile IRBMs (i.e., Scud missiles) launched against Saudi Arabia and

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[82] For discussion of this particular issue, see for example CD/PV 164, *Op. cit.* (USSR); "Statement submitted by Belgium to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 167, 30 March 1982, pp. 43-44; "Statement submitted by Sweden to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 168, 1 April 1982, pp. 7-10; "Statement submitted by Austria to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 532, 6 February 1990, p. 17; CD/954, *Op. cit.*, p. 7 (Report of the *Ad Hoc* PAROS Committee); "Statement submitted by Sweden to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 541, 8 March 1990, pp. 4-8.

[83] Space-to-ground operations are detected by the random checking of the original departure point of of, say, a nuclear plant and the mapping of the trajectory employed to transport the material to its final destination which can be a nuclear waste disposal site, a recycling plant, or a military installation, such monitoring being technically feasible via the tracking of (a) neutrons and (b) gamma ray movements on the ground. For example the US Air Force satellite, the P86-2 Starscan, has been specially commissioned for nuclear detection and it is planned to send it into an orbit of about 550 km by a Titan 2 rocket in 1991 (see "Satellite anti-proliferation", *Armées d'Aujourd'Hui*, No. 125, November 1987, p. 8). The equipment of the NAVSTAR system with similar nuclear sensors is also planned (see Rutkowski, *op. cit.*, p. 51). Other less sophisticated systems and sensors were used in US Vela satellites during the 1960s. There has also been speculation as to whether satellites might be able to detect chemical weapons and their key precursors with chemical sensors. Technically, the satellite's analysis of the spectrometry would range from ultraviolet to infra-red on the basis of the "control of emission spectra from effluents from fermentation plants and national registration of lines of cells, and plants used for experiment or production purposes", see Åberg, B., "Implications for the Projected Chemical Weapons Convention of New Industries such as those using Gene Technology", *SIPRI/Pugwash Conference*, The Chemical Industry and the Projected Chemical Weapons Convention, Working Paper CIPWC/WP.1, Stockholm: 24-26 October 1985, p. 4.

[84] For further discussion on the role and functioning of ocean surveillance satellites, see "La surveillance oceanique par satellite," by N. Lannelonque and Jaques Cymbalista, in *Colloque Activités Spaciales Militaires*, Association Aéronautique et Astronautique de France: Paris, 1988, pp. 131-42.

[85] See, for example, a discussion in CD/PV 423, *Op. cit.*, p. 11.

[86] The interested reader might like to refer, inter alia, to "USAF Missile Warning Satellites Providing 90-Sec. Scud Attack Alert," by Craig Covault, *Aviation Week & Space Technology*, January 21, 1991, pp. 60-1; "Satellites Homing In on Scuds: Infrared Telescope Allows Instant Post-Launch Detection," by Michael Richardson, *International Herald Tribune*, January 25, 1991, p. 5; "Recon Satellites Lead Allied Intelligence Efforts, " by Craig Covault, *Aviation Week & Space Technology*, February 4, 1991, pp. 24-5.

Israel.[87] Another example was the use of several military imagery satellites to assess the strike effectiveness of bomber and artillery missions as a complement to the conventional role played by imagery satellites in target-spotting and observing Iraqi positions through day-and-night/all-weather sensors.[88] Bomb Damage Assessment (BDA) functions of satellites include the supply of traditional high-resolution,[89] night infra-red, and other advanced sensor imagery for strategic and tactical bombing missions by KH-11 [Key Hole-11] type spacecraft in polar orbit and Lacrosse radar imaging satellites.[90]

Another factor to be considered in any CD assessment of the military use of outer space is the military use of civilian space assets.[91] Some civilian satellites yield data which may serve as a military support element, while others perform military or military-related assignments or carry military components on board.[92] In the case of civilian satellite data, data from the US Landsat or the French SPOT systems can be used for military purposes according to the resolution required,[93] and the French radiocommunications programmes TELECOM 1 and 2 and SYRACUSE I and II are examples of civilian platforms carrying military components.[94] Most of the delegations which have addressed the question have acknowledged the fact that the dual-function capability of satellites further complicates the task of identifying and defining a clear-cut line between civilian and military satellites and activities, and it is exactly this difficulty which constitutes the basis of one of the French proposals on the immunity of satellites.[95]

Military space activity has mainly been to support observation of earth and military communication networks and it has been estimated that, of all the satellites

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[87] *Loc. cit.* While the ground segment of DSP is the Nurrungar control station at Alice Springs (central Australia), the US Space Command's Missile Warning Centre is at Cheyenne Mountain, Colorado Springs, Col., USA. The infra-red telescope in the space-based segment picked up the intense heat of the Iraqi mobile IRBMs within 30 seconds of their take-off and detected the heat signature from the Scud rocket plume. After several scans of the rocket plume, the spacecraft's on-board software corrects the IRBM trajectory and determines an impact zone. The information received from satellites provides almost instant warning to Patriot anti-missile batteries and can also assess the general area in which fighters and bombers would search for camouflaged mobile IRBMs.

[88] *Loc. cit.*; Satellite imagery is an integral component of several sophisticated devices ranging from unmanned vehicles of the Pioneer and Pointer type to aircraft such as the USAF E-8 Joint-STARS which carry synthetic aperture radar (SAR). See "U.S. Relies on Combination of Aircraft, Satellites, UAVs for Damage Assessment," by Bruce D. Nordwall, *Aviation Week & Space Technology*, February 4, 1991, pp. 24-5.

[89] The term "resolution" is used here to determine the size of the objects to be detected by an image sensor. The smaller the resolution, the more details would be visible in the image produced by optical systems, i.e., detection, recognition, identification, and/or description of objects scanned. The parameters of a resolution depend on the distance between the detector and the targeted object (orbit height), different types of atmospheric turbulence, and other interacting elements. For a discussion on the various definitions of the term "resolution," see Christian Drewniok, "The Use of Observation Satellites for Conventional Arms Control Verification," *Unconventional Approaches to Conventional Arms Control Verification: An Exploratory Assessment*, John Grin and Henny Van Der Graaf (ed.), Amsterdam: Vu University Press, 1990, pp. 153-181.

[90] Covault, "Recon Satellites Lead Allied Intelligence Efforts," *Op. cit.*

[91] On the question of dual-capable and dual-use (civilian and/or military uses) of outer space, see the studies undertaken by UNIDIR *Peaceful and Non-Peaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race, Op. cit.*; and *Civil Uses of Outer Space: Implications for International Security*, by Stephen Dolye, UNIDIR, New York, Taylor & Francis, forthcoming, 1992.

[92] The reverse is also true as in the case of navigation satellites. For example, the radio-navigation system designed for military use, the NAVISTAR GPS [NAVISTAR Global Positioning System], supplies radio signals for both military operations and civilian purposes. For more on NAVISTAR military and civilian capabilities, see "The NAVISTAR GPS", by Jim Eyman and Tom Logsdon in *Colloque Activités Spaciales Militaires, Op. cit.*, pp. 161-187.

[93] On the military application of civilian satellites, see Ghirardi, Raymond and Fernand Verger. "Géographie des lancements de satellites." *Mappe Monde*, vol. 2, 1987, pp. 15-21; See also "French Satellite Shows Soviet Northern Fleet Facilities", *AW & ST*, March 2, 1987; Isabelle Sourbès and Yves Boyer, "Technical Aspects of Peaceful and Non-Peaceful Uses of Space," in *Peaceful and Non-Peaceful Uses of Space: Problems of Definition for the Prevention of an Arms Race, Op. cit.*, p. 69-81.

[94] For a discussion of the Télécom programme, the PTT-Défense, and the SYRACUSE programme, see Ghislain du Chéné, "SYRACUSE: et les programmes futurs de télécomunications," in *Colloque Activités Spaciales Militaires, Op. cit.*, pp. 211-18.

[95] For example, see a discussion in CD/PV 303, *Op. cit.*, pp. 14-16.

launched so far, 50-75% were military satellites.[96] Discussions at the *Ad Hoc* PAROS Committee have revealed the importance some delegations attach to military support space systems, and one of the major arguments has been that, in playing a stabilizing role, these systems often have a deterrent effect on the two major powers' strategic relationship.[97] However, it has also been argued that the only military use of space should be the *verification of arms limitation and disarmament*,[98] an argument which has received some political support. However, its implementation constitutes a considerable political and practical obstacle, because it would necessitate changing and adapting a whole range of military activities such as intelligence gathering, early warning, ground and air operations, plus, of course, military and political practices.[99]

b. Space Weapons and Weapon Systems

Unlike dedicated and non-dedicated military space platforms which are regularly launched into space for short and long orbital life, space weapons have so far not been permanently stationed in that environment. However, in similar fashion to space remote-sensing devices, space weapons and weapon systems do vary quite extensively in nature, operation, and application as may been seen from Table V which groups various types of space weapons and weapon systems according to their major characteristics and application potential. The Table is not intended to reflect all space weapons and weapon systems or to rigorously define their characteristics. However, it is an illustration of the major concerns expressed in the CD on R&D trends in space capable weapons.

So far, no delegation to the CD has presented a comprehensive review of existing and/or potential space capable weapons, but two distinct weapon system categories have been identified in statements concerning specific scientific principles guiding their functional firepower: Kinetic Energy Weapons (KEWs) and Directed Energy Weapons (DEWs).[100] By definition, KEWs are devices whose destructive power is based on the

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[96] See, for instance, "Statement submitted by Morocco to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 508, 13 July 1989, p. 16; for a longer discussion, see Isabelle Sourbès and Yves Boyer, *Op. cit.*, p. 71. For discussion, references and data on military photographic and electronic reconnaissance, ocean-surveillance and oceanographic, early-warning, meteorological, navigation, and communications satellites launched between the late 1950s and 1987, see Bhupendra Jasani, *Space and International Security, Op. cit.*; Jaques Villain, "Programmes et budgets spatiaux militaires dans le monde," *Colloque Activités Spaciales Militaires, Op. cit.*, pp. 89-103.

[97] This role is believed to have a particularly stabilizing character in the case of communication and early-warning satellites; for brief statements on this, see CD/954, *Op. cit.*, p. 7 (Report of the *Ad Hoc* PAROS Committee); CD/PV 541, *Op. cit.*, pp. 4-5 (Sweden).

[98] For example, see CD/PV 532, *Op. cit.*, p. 17 (Austria); CD/PV 538, *Op. cit.*, p. 15; CD/PV 554, *Op. cit.*, p. 7.

[99] For the reaction of delegations to proposals that satellites be used to verify arms limitation and disarmament agreements, see the discussion on possible institutional agreements for the verification of the prevention of an arms race in outer space, *infra*, Part II, C.

[100] For example, see "Statement submitted by Sweden to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 252, 22 March 1984, pp. 15-20; "Statement submitted by Sri Lanka to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 254, 29 March 1984, pp. 8-12; CD/PV 253, *Op. cit.*, pp. 8-11 (Czechoslovakia); CD/PV 301, *Op. cit.* pp. 16-19 (Sweden); CD/PV 303, *Op. cit.*, pp. 14-16 (France); CD/PV 303, *Op. cit.*, pp. 20-23 (German Democratic Republic); "Statement submitted by China to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 372, 22 June 1986, pp. 5-8; CD/PV 423, *Op. cit.* For technical descriptions of KEWs, DEWs and their use, see *APS Report*, 60; "Ballistic Missile Defense Technologies," *U.S. Congress, Office of Technology Assessment*, OTA-ISC-254, Washington D.C.: U.S. Government Printing Office, September 1985; "Directed Energy Missile Defense in Space - Background Paper," *U.S. Congress, Office of Technology Assessment*, OTA-BP-ISC-26, Washington D.C.: U.S. Government Printing Office, April 1984; Jasani (ed.), *Peaceful and Non-Peaceful Uses of Outer Space: Problems of Definition for the Prevention of an Arms Race in Outer Space, Op. cit.*, pp. 22-23; *Disarmament: Problems Related to Outer Space, Op. cit.*; see also Bhupendra Jasani, (ed.) in *Space Weapons and International Security*, Oxford: Stockholm International Peace Research Institute, 1987,

(continued...)

impact of the weapon's mass with, or by explosion near, another object travelling in its path. KEWs are conventionally known rockets propelled by electromagnetic or chemical sources which may carry high explosive, chemical, or nuclear payloads.[101] The family of KEWs may comprise anti-ballistic missiles as well as ASAT weapons. An overwhelming number of delegations to the CD subscribe to the view that ground and air-launched KE ASAT weapons and other ASAT capable devices have been or are being developed.[102] Among the KEWs widely believed to be capable of being used in ASAT mode are the US ABM Spartan and Sprint missile types and the Soviet 1b/Galosh ABM system. Examples of other weapons believed to be ASAT capable of KE kill include the US F-15 launched Short-Range Attack Missile (AGM-69)[103] and the modified tested version of the Soviet SS-9 ICBM.[104] The existence of dedicated ASAT weapons - and, to a lesser extent, non-dedicated ones - is of some importance for the CD, one of the main concerns being that ASAT systems capability poses a threat to low orbit devices such as reconnaissance satellites and, eventually, even early-warning or telecommunications satellites in higher orbits.[105] The destruction of such satellites could have serious repercussions for international security because, as stressed by the Swedish delegation, the employment of ASAT weapons could on the one hand trigger similar or other destabilizing measures by an opponent while on the other the blinding of early-warning satellites via ASAT means could be interpreted by an opponent as the preparation for a nuclear attack.[106] Perhaps this is the reason why some delegations to the PAROS Committee maintain that a ban on ASAT weapons should be a matter of priority.

However, the area of greatest concern at the CD as far as the future development of space strike weapons capability is concerned is probably focused on directed energy weapons - the so-called *exotic* weapons.[107] DEWs are devices which are not based on the physical impact of two masses but on the wavelength of laser and particle beams as well as high-power radio frequency,[108] and they are designed to deliver lethal amounts of energy at or near the speed of light on to their targets. In general, DEW strike capability results in the overheating of the target surface and internal equipments. Among the most quoted DEWs are Chemical Lasers (Cls), Excimer Lasers (Els), Free Electron Lasers (FELs), X-ray Lasers (XrLs), High-Power Radio Frequency (HPRF),

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[100](...continued)
pp. 14-34; R. Z. Sageev and S. N. Rodionov, *Space-Based Anti-Missile Systems: Capability Assessments*, Moscow: Academy of Sciences of the USSR, Space Research Institute, March 1986.

[101] In practical terms, however, not all of these payloads may be desirable for use in the outer space environment. For example, blast-effect from the explosion of conventional or nuclear munition cannot be transmitted, although the vacuum and kinetic energy impact, or even radiation effects, are believed to be the most efficient target-kill means of KE space weapons.

[102] See, for example, CD/PV 252, *Op. cit.*, pp. 15-20; (Sweden); CD/PV 253, *Op. cit.*, pp. 8-11 (Czechoslovakia); CD/PV 254, *Op. cit.*, pp. 8-12 (Sri Lanka); CD/PV 301, *Op. cit.*, pp. 16-19 (Sweden); CD/PV 303, *Op. cit.*, pp. 14-16 (France); CD/PV 372, *Op. cit.*pp. 5-8 (China); CD/PV 423, *Op. cit.*, pp. 8-12 (India).

[103] Jasani, *Space Weapons and International Security, Op. cit.*, pp. 17-18; *Arms Control and National Security: An Introduction*, Washington D.C.: Arms Control Association, 1989, pp. 87-91.

[104] *Loc.cit.*; also see *Soviet Military Power: 1990*, Washington D.C.: Department of Defence, 1990, pp. 60-63.

[105] See, for example, CD/PV 252, *Op. cit.*, pp. 15-16 (Sweden).

[106] *Loc. cit.*

[107] See, for example, CD/PV 254, *Op. cit.*, pp. 8-12 (Sri Lanka); CD/PV 301, *Op. cit.*, pp. 16-19 (Sweden); CD/PV 372, *Op. cit.*, pp. 5-8 (China); CD/PV 423, *Op. cit.*, pp. 8-12 (India).

[108] See Jasani (ed.), *Peaceful and Non-Peaceful Uses of Outer Space: Problems of Definition for the Prevention of an Arms Race in Outer Space, Op. Cit.*, pp. 23-24.

Nuclear-Driven Directed Energy Weapons (NDEWs), and Neutron-Particle Beams (NPBs).

There was increased interest in the early 1980s in research on different space weapons and weapon systems based on KE or DE principles, and despite a widespread belief that research decelerated between 1987 and 1990, R&D on these weapons has in fact continued at a steady pace to the point that it is now reaching the test validation stage. For example, Figure 2 shows the January 1990 flight test of a potential theatre defence missile to counter ballistic missile re-entry vehicles high in the atmosphere: the HEDI/KITE [High Endoatmospheric Defense Interceptor/Kinetic Energy Kill Vehicle Integrated Technology Experiment] ground-based, hypervelocity, high-acceleration interceptor.[109] Reports on DEW research indicate particular concentration on at least three conceptual areas: X-ray lasers, hypervelocity pellets, and optical lasers.[110] Most of the weapons listed in Table V are still in the early conceptualization stage and although information regarding R&D in this field is not always available in the open literature, it is known that weapons based upon Els, FELs, and NDEWs technology are under feasibility study. Others, including Cls such as the US ALPHA Cls with its Large Advanced Mirror Program (LAMP), are in a more advanced stage of integration and experiment in the space environment.[111] Moreover, a significant number of new technologies have also been tested on the ground and in space in the past few years and Figure 3 shows the ground experiments which have tested the lethality of certain laser weapons. In another experiment, the launching of NPB devices into space demonstrated, *inter alia*, the propagation of particle beams in that environment.

Yet a further substantial subject of discussion in the CD is the distinction to be drawn between ASAT and ABM weapons which in many cases lies mainly in their operation and employment. In their general military application potential, these two weapon systems have four common characteristics:[112] their place of deployment, their orientation, and the location and nature of their targets. A basic ABM system consists of missiles electromagnetically and chemically boosted, designed to counter incoming ballistic missiles or RVs in their terminal phase by kinetic energy impact. ABMs have therefore been conceived to execute both endo-atmospheric and exo-atmospheric missions. This implies that although the primary military applications of the ABM and ASAT weapon systems are not the same, certain ABMs (which in principle are designed to intercept ballistic missiles) can also be employed to destroy satellites in low orbits, thereby functioning as anti-satellite weapons - e.g., damaging space objects by means of

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[109] "1990 Report to the Congress on the Strategic Defense Initiative," *Strategic Defense Initiative Organization*, Washington, D.C., May 1990, p. 4.11-4.12.

[110] See "Fiscal Year 1991 Arms Control Impact Statements", Statement Submitted to the Congress by the President Pursuant to Section 36 of the Arms Control and Disarmament Act, *Committees on Foreign Affairs Relations of the House of Representatives and Senate*, 101st Congress, 2d Session, Washington D.C., April 1990, pp. 82-83; see also "SDI: Technology Survivability and Software," *Office of Technology Assessment*, Washington D.C., 1988, pp. 21-23.

[111] "Fiscal Year 1991 Arms Control Impact Statements", *Op. cit.*, p. 78.

[112] For a discussion on the distinction between ABM and ASAT weapons, see *infra*, Part II, Chapter I, A., 3-4; Ashton Carter, Donald L. Hafner, and Thomas H. Johnson's article entitled "Technical Demarcations for ASAT and BMD Systems", in *Peaceful and Non-Peaceful Uses of Outer Space*, Bhupendra Jasani, (ed.), *Op. cit.*, pp. 119-138; see also Thomas H. Johmson, "Ground-Based ABM Systems", in Antonia Chayes and Paul Doty, (eds.), *Defending Deterrence*, New York, Pergamon-Brassey, 1989, pp. 111-131; for a brief article on the technical and operational overlaps and differences between ASAT and BMD, see Ashton Carter entitled "ASAT and BMD," in *Strategic Defences and the Future of the Arms Race*, a Pugwash Symposium, John Holdren and Joseph Rotblat (eds.), Houndmills: The Macmillian Press LTD, 1987, pp. 96-101.

TABLE V

PRINCIPAL R&D OF SPACE WEAPONS AND SPACE WEAPON SYSTEMS§

Weapon Category	Propulsion Power/ Operation	Payload/ Strike Capability	Type of Orientation	Type of Damage	Application Potentials
A) Kinetic Energy Weapons (KEWs) Ballistic and Homing Projectiles, Homing Interceptors	-Electromagnetic and chemical rockets	-Chemical, nuclear	-I, II, III	-Thermal heating through wave-length, physical impact	-ABM, ASAT
B) Directed Energy Weapons (DEWs) 1) High-Energy Lasers (HELs)					
a) Chemical Lasers (Cls)	-Deuterium and fluoride, oxygen and iodine	-Radiation in the form of a laser beam	-III¶	-Thermal shock and melting of C^3I sensors, shock wave on missile	-ASAT
b) Excimer Lasers (Els)	-Krypton-fluoride or chlorine-xenon molecules - near ultraviolet to visible region of the electromagnetic spectrum	-Laser beam energy in J/cm2, kj	-II¶¶, III¶	-Temporary/permanent overheating or blinding of optical and C^3I sensors, shock wave on missile	-ABM, ASAT
c) Free Electron Lasers (FELs)	-Electron beam (infra-red radiation)	-Laser beam	-I, II¶¶, III¶	-Temporary/permanent overheating or blinding of C^3I sensors, shock wave on missile	-ABM, ASAT
d) X-ray Lasers (XrLs)	-Electromagnetic radiation, nuclear explosion	-Laser beam	-I, III	-Thermal/radiation damage to C^3I, shock wave on missile	-ABM, ASAT
2) High-Power Radio-Frequency (HPRF)	-	-Intense beams of radio-frequency radiation	-I, II, III	-Overheating of mainframe on-board temperatures and external C^3I equipments (e.g., antennas)	-ASAT
3) Nuclear-Driven Directed Energy (NDE)	-Nuclear explosion, radiation	-X-ray laser beam	-I, II	-Radiation	-ABM
4) Neutron Particle Beams (NPBs)	-Electron acceleration of hydrogen ion	-Neutral beam (energy in MeV/m)	-I¶, II	-Thermal and irradiation effects on sensitive components	-ABM, ASAT

§= Includes weapons & weapon systems under operational and/or R&D status; ¶= Reaches the target via a mirror system; ¶¶= Feasibility questioned; **J**= Joules; **MeV/m**= Million electron volts per metre; **ABM**= Anti-Ballistic Missile; **ASAT**= Anti-Satellite Weapon; C3I= Command, Control, Communication and Intelligence; **I**= Space-to-air/earth; **II**= Space-to-space; **III**= Earth-to-air/space

Source: Compiled from discussions in technical and other reports published in *APS Report*, 60; Bhupendra Jasani (ed.), *Space Weapons and International Security*, Oxford University Press, 1987; *Disarmament: Problems Related to Outer Space*, UNIDIR, New York: United Nations Publication, 1987; *Satellite Warfare: A Challenge for the International Community*, by Pierre Lellouche, ed., IFRI/UNIDIR, New York: United Nations Publication, 1987; Bekefi, G., B. T. Feld, J. Parmentola, K. Tsipis, "Particle Beam Weapons - A Technical Assessment," *Nature*, vol. 284, No. 5753, March 20, 1980, pp. 219-25; John A. Jüngerman, *The Strategic Defense Initiative: A Primer and Critique*, San Diego: University of California Institute on Global Conflict and Cooperation, 1988.

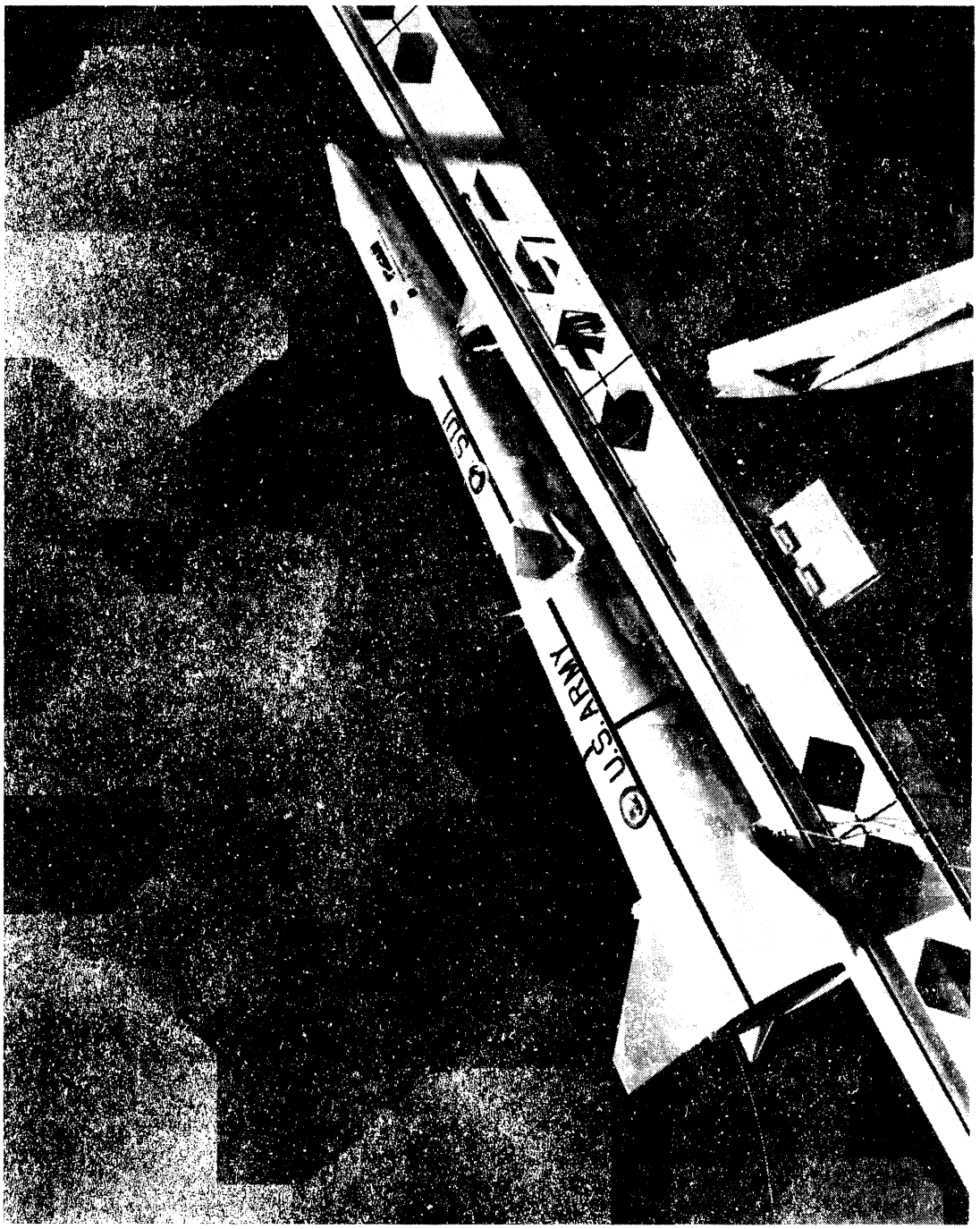
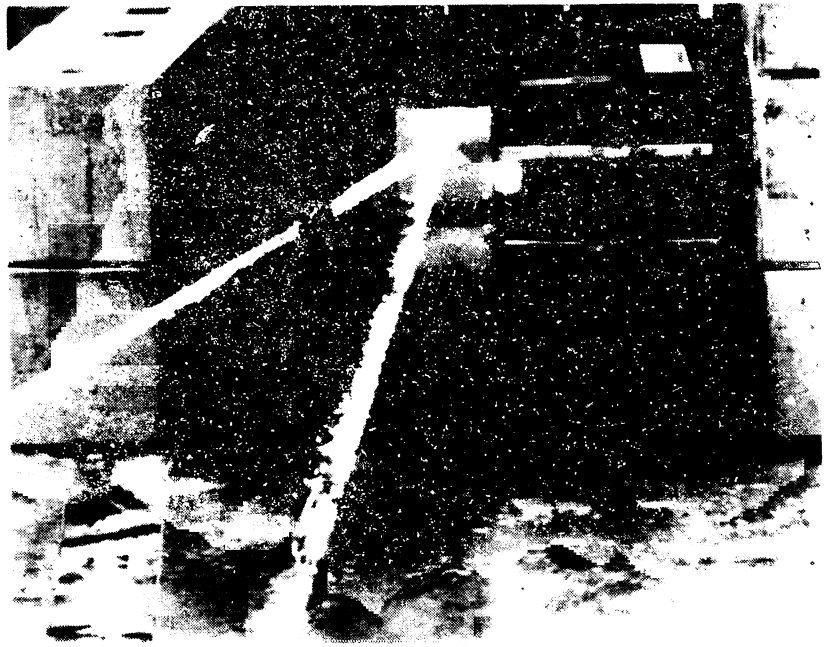


FIGURE 2: ENDO-ATMOSPHERIC KINETIC ENERGY INTERCEPTOR

(Courtesy of SDIO/USDoD)

Defense Nuclear Agency

LASER LETHALITY BREAKTHROUGH



- KILLING ICBM BOOSTERS WITH A LASER "HOT KNIFE"
- "HOT KNIFING" DRAMATICALLY REDUCES REQUIRED ENERGY

(Courtesy of SDIO/USDoD)

FIGURE 3: LETHALITY TEST FOR LASER WEAPONS

thermal shock and gamma radiation, or through the kinetic energy of a head-on collision.[113]

Again, this is true of certain types of ASAT weapons which are also capable of intercepting ballistic missiles.[114] In any event, the issue is further complicated because some of these weapons could be deployed in, and directed to, various environments. While some of the systems based on the principle of directed energy (e.g., particle beams) are - in the present state of technology - intended to be deployed only in outer space, their orientation could so change that they would be able to strike targets in the air, on the ground and in outer space. In other cases, the research conception of Cls, which would be deployed on the ground, limits its use to that of an earth-to-air/space weapon. However, FEL weapons could prove to be capable of having space-to-air/earth, space-to-space, and earth-to-air/space orientations.

These overlapping characteristics reinforce the dual-strike capability of certain space weapons operating in ASAT or ABM mode, whether they are deployed on the ground, at sea or in space or are air-launched. This is thought to be crucial for future CD negotiations because, as pointed out by India, the technological differences between effective ballistic missiles defence and ASAT weapon systems (which include spacemines, jamming and deception measures, and ground stations attack) will be of particular relevance in the establishment of a ban on ASAT systems.[115]

Another issue of concern sparked by dual ASAT/ABM weapons capability was raised by the Swedish delegation - namely, that modified ASAT weapons homing devices could be used in ABM mode and thus the development and testing of ASAT weapons was a potential erosion risk for the ABM Treaty.[116] This argument is countered by proposals which maintain that a comprehensive ban on ASAT weapons should include testing, development, deployment, and the *elimination of existing ASAT systems.* However, other countries - e.g., The Netherlands - go even further by emphasizing the fact that, since the same technology can be used in both ASAT systems and defence systems against BMs, this is tantamount to saying that "...it is no use banning one of these systems and letting the other one go ahead".[117]

Despite the differences of appreciation, these views attest to the importance of a better understanding of the basic technical characteristics and functional boundaries of space weapons and weapon systems.

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[113] For discussions on this subject see, for instance, "Arms Control and Outer Space," submitted by Canada to the *Conference on Disarmament*, CD/320, 26 August 1982, pp. 11-25; Ashton B. Carter in "The Relationship of ASAT and BMD Systems," *Weapons in Space, op. cit.*, pp. 171-89; "Space Weapons - Technical Aspects", Bhupendra Jasani (ed.), *Space Weapons and International Security*, Oxford University Press, 1987, pp. 14-35.

[114] There are conceptual and practical difficulties which would hinder DE-based ASAT weapons from functioning as ABMs, the most important one mentioned in the open literature being that ASAT weapons would have to employ large amounts of energy because ballistic missiles are protected against laser energy by the heat shield which is necessary to re-enter the earth's atmosphere, and because they continuously spin on their axis, thus frequently altering the laser's point of contact. See CD/320, *Op. cit.* (Canada), pp. 20-21.; for a technical discussion see *APS* Report, 60.

[115] CD/PV 423, *Op. cit.*, p. 11 (India).

[116] CD/PV 252, *Op. cit.*, pp. 15-16 (Sweden).

[117] CD/PV 301, *Op. cit.*, p. 18 (Sweden).

4. Strategic Defence

Strategic Defence (SD) is another topic which has occupied an important place in the work of the CD and the *Ad Hoc* PAROS Committee for several years,[118] and there are three main reasons why SD plus Ballistic Missile Defense (BMD) should have such an impact on these talks.[119]

The first is the possible deployment of SD using kinetic or directed energy, whether ground or space-based, or sea- or air-launched. The second is the possible actual use of the weapons, because they will either home-in on their target in outer space or travel through outer space. The preferred strategical choice for an optimal architecture of SD would include an option designed to destroy an incoming missile while it is still in its boost or post-boost phase, and this would probably require the deployment of Space-Based Interceptors (SBIs) and/or mirrors in orbital planes in space in order to direct laser beams towards missiles at their initial launching stages.[120] The third reason is that the United States and the Soviet Union are both engaged in SD research, so that the implications of new developments are closely followed by states represented at the CD.

In consequence, many delegations have asked how SD will affect the status of the military use of outer space in the future, and what effect deployment of SD systems (including ground-deployed space weapons similar to ABM weapons) would have on the prevention of an arms race in outer space, especially from the viewpoint of technological orientation in relation to space law such as the Outer Space and ABM Treaties. To help to clarify these questions, consideration is given below to SD policy and development in the United States and the Soviet Union.

a. United States

The United States first raised the question of defense against nuclear attack at the end of World War II,[121] an issue which gained particular momentum in the 1960s with the deployment of small anti-ballistic missile systems and the research then being

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[118] For example, see "Statement submitted by Mongolia to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 233, 11 August 1983, pp. 6-9; "Statement submitted by Egypt to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 254, 29 March 1984, pp. 21-22; "Statement submitted by Poland to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 402 April 1989, pp. 7-9.

[119] SD is used to describe a system of defence against offensive long-range missile/bomber forces. This implies the ability to counter intercontinental ballistic missiles (either ground or sea-launched, or air-launched cruise missiles carried by strategic bombers) during their flights with BMD. The BMD principle is similar in both operation and design to that used by present ABM systems, although BMD strategic foundations differ quite substantially from ABM systems. This is explained by the characteristics of an ABM system, since it is only a component of a nuclear deterrence doctrine based upon the assured destruction of an opponent in a nuclear retaliatory strike. As a component of this doctrine, the role of an ABM system consists of defending ICBMs in their home-silos in order to ensure this retaliatory capability. On the other hand, SD, seen from the BMD angle, is a defence system based on a strategy which seeks to replace this deterrent factor by the ability to counter incoming missiles or multiple re-entry vehicles (MRVs) during a strategic nuclear attack in such a way as to shift the focus of deterrence from assured destruction through retaliation to a deterrent measure which would render a potential nuclear attack ineffective.

[120] See "SDI: Technology Survivability and Software," *Op. cit.*, p. 4; "Strategic Defenses: Alternative Missions and Their Costs," in *Congress of the United States, Congressional Budget Office*, A Special Study, Washington, D.C., 1989.

[121] For a comprehensive history of the US position, see "Past and Present: The Historical Legacy," by David N. Schwartz in *Ballistic Missile Defense, Op. cit.*, pp. 330-49; for a brief history, see Matthew Bunn, *Foundation for the Future: The ABM Treaty and National Security*, Washington D.C.: The Arms Control Association, 1990, pp. 12-19; André Dumoulin, "Une idée ancienne", in *Guerre des étoiles: la grand illusion*, Bruxelles: GRIP, No. 8, Printemps 1986, pp. 8-9.

undertaken in ballistic missile defence. In the 1970s, however, US interest in ABM systems faded as may be seen from its acceptance of treaty limits on ABM deployment and its decision not to maintain its permitted ABM system in operation. A decade later, the question of defence against a nuclear attack took on a new dimension with the development of research into the possible deployment of BMD, and in March 1983 President Ronald Reagan launched a major research programme to protect the USA and its allies from a wide-scale nuclear attack.[122] This programme, known as the Strategic Defense Initiative (SDI),[123] has since been revised by the Bush Administration and the basic framework within which SDI is now being developed by the Strategic Defence Initiative Organization (SDIO) consists of four potential BMD missions:

- A Hedge Mission;
- An Accidental Launch Protection System;
- A System to Protect Silo-Based ICBMs;
- The Administration Plan
  - Phase I;
  - Phase II;
  - Follow-on Phases.[124]

Although each of these missions is intended to be an independent entity, some of their technological components and operational features are interchangeable. The purpose of the Hedge Mission is to provide the United States with an SD technological hedge in weapons and sensors over other countries (particularly the Soviet Union) should they deploy a widespread SD system at some future point. Unlike the other three missions, Hedge is not meant to contain a deployment phase. The second SDI mission is to deploy a limited defence system to protect the United States from a small number of incoming ballistic missiles, on the premise that such a system could counter nuclear missiles launched either by accident or by unauthorized means. Another rationale would

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[122] "President Reagan's National Security Address, 23 March 1983, Washington D.C.", *Daily Bulletin*, US Mission, Geneva/US Embassy, Bern, Supplement, No. 10, 24 March 1983; on the origin of the research initiatives announced in this speech, see *High Frontier: A New National Strategy*, High Frontier, 1010 Vermont Ave., N.W., Suite 1000, Washington D.C. 20005; *The Strategic Defense Initiative: Defensive Technologies Study*, US Department of Defense, Washington, D.C.: United States Government Printing Office, 1984; for the Soviet view of the SDI programme, see "Statement submitted by the Union of the Soviet Socialist Republics to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 252, 22 March 1984, pp. 6-11; "Statement submitted by the Union of the Soviet Socialist Republics to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 320, 11 July 1985, pp. 16-20; "Statement submitted by the Union of the Soviet Socialist Republics to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 341, 20 February 1986, pp. 7-14; *Star Wars: Delusions and Dangers*, Moscow: Military Publishing House, 1985; *Weaponry in Space: The Dilemma of Security*, Yevgeni Velikhov, Roald Sagdeev, and Andrei Kokoshin (eds), Moscow: Mir Publishers, 1986; *Reykjavik, The ABM Treaty and SDI*, by Vladimir Chernyshev, Novosti Press Agency Publishing House: Moscow, 1987; *Whence the Threat to Peace*, Moscow: Military Publishing House, 1987; "Disarmament and Security: 1986," *IMEMO Yearbook*, 1987, pp. 62-87; for other views, see CD/PV 253, *Op. cit.*, pp. 8-11 (Czechoslovakia); "Statement submitted by Mexico to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 301, 21 March 1985, pp. 29-30; CD/PV 402, *Op. cit.*, pp. 7-9 (Poland).

[123] SDI is a programme to examine technologies and concepts to counter ICBMs. Another approach, entitled Air Defense Initiative (ADI) and which did not receive funds, proposed the development of protection systems against nuclear attack by bombs and missiles whether air or sea-launched. Present SDI system architecture includes Submarine-Launched Ballistic Missiles (SLBMs). See the "1990 Report to the Congress on the Strategic Defense Initiative," *Op. cit.*; and other annual reports of the same series since 1985; *Report of the Defense Science Board Task Force Subgroup on Strategic Air Defense: SDI Milestone Panel*, Washington, D.C.: Department of Defense, May 1988. For a technical discussion of SDI applications against an air attack, see Harvey L. Lynch, *Technical Evaluation of Offensive Uses of SDI*, Stanford University: Centre for International Security and Arms Control, 1987.

[124] For discussion on the military implications of these missions, see "1990 Report to the Congress on the Strategic Defense Initiative," *Op. cit.*; for their costs, advantages and disadvantages, see "Strategic Defenses: Alternative Missions and Their Costs," *Op. cit.*

be to counter the potential threats emerging from the proliferation of nuclear, chemical, and biological-capable ballistic missiles. It is thought that an effective SD system would be able to provide substantial protection against an attack by a limited number of ballistic missiles. So far there has been no indication in the literature as to what type of targets would be protected. For the third mission, however, a substantially larger number of strategic forces would protect some of the United States ICBMs, thus ensuring deterrence through a significant retaliatory capability. This mission has often been seen as an alternative to existing ICBMs passive protective measures by either hardening their home-silos or deploying mobile systems.

After the third mission, there would be a more ambitious deployment of defensive forces to protect the population against a large-scale nuclear attack. The fourth mission is to be accomplished in stages, with the first phase probably being designed to deploy space/ground-based sensors and ground-based Exo-atmospheric Interceptors Systems (ERIS). A second phase could then be launched whereby protection would be provided via a *adaptive preferential defence* strategy giving priority to missile silos and command posts.[125] Follow-on phases would then increase the protection capability to such an extent that both US and allied populations would be significantly shielded against large-scale attack (see Figure 4). Lastly, the SDI's ultimate goal is said to be the deployment of a workable SD system which, in the event of a nuclear war, would permit a move from Mutual Assured Destruction (MAD) to Mutual Assured Survival (MAS).

Following the technical achievement of the Patriot anti-missile in Saudi Arabia and Israel, President Bush has called for a new study which would re-orientate the SDI programme towards protection against limited ballistic missile strikes[126] via a new system called Global Protection against Limited Strikes (GPALS). As shown below, the revised SDI Program Focus differs significantly in strategy from its predecessor:[127]

Concept and Focus

SDI Phase I	GPALS
• Objective: Deterrence of massive, deliberate attacks by the Soviet Union;	• Objective: to assure protection against limited strikes, whatever their source;
• Means : Via a defense system sized to enhance defense posture by substantially increasing Soviet attack uncertainty.	• Means : at less than half the size of the SDI Phase I architecture, and not intended to pose a threat to Soviet retaliatory capability.[128]

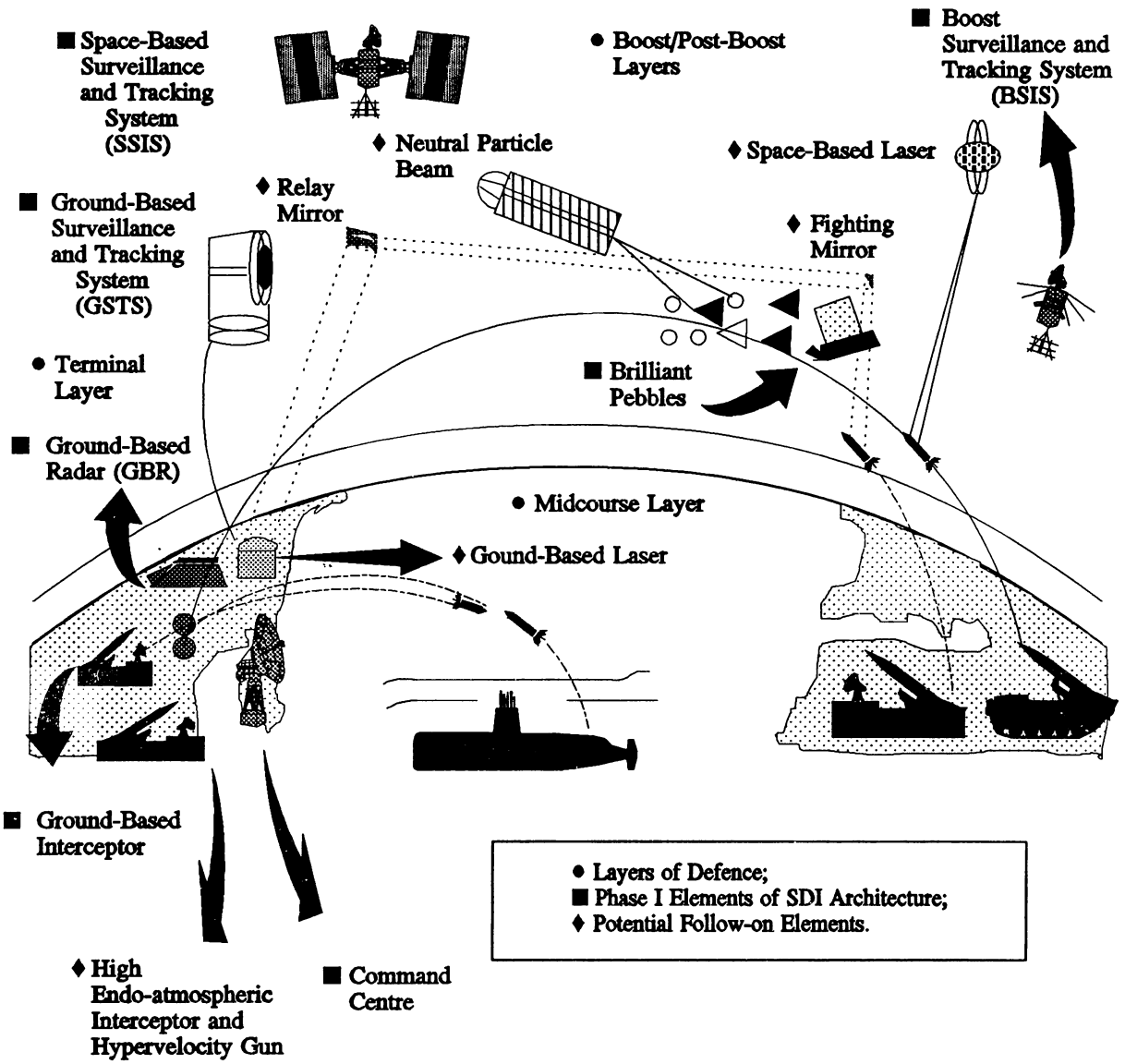
[125] The *adaptive preferential defence* strategy is a disruption of incoming ballistic missiles by the first layer of space-based defence, followed by a defence, by the ground-base defence layer, of high-value US targets under attack by the least number of RVs. See "SDI: Technology Survivability and Software," *Op. cit.*, p. 11.

[126] See President Bush "State of the Union Address," *Daily Bulletin*, US Mission, Geneva/US Embassy, Bern, 29 January 1991, p. 24; *Briefing On The Refocused Strategic Defense Initiative: Global Protection Against Limited Strikes (GPLAS)*, Washington, D.C., Department of Defense, Strategic Defense Initiative, 12 February 1991; "1991 Report to the Congress on the Strategic Defense Initiative," *Strategic Defense Initiative Organization*, Washington, D.C., May 1991.

[127] "Latter Dated 8 July 1991 from the Deputy Representative of the United States of America Addressed to the President of the Conference on Disarmament Transmitting a Statement delivered on 25 June 1991, By Ambassador David J. Smith, Chief United States Negotiator for the Defense and Space Talks, in the *Ad Hoc* Committee on the Prevention of an Arms Race in Outer Space of the Conference on Disarmament," *Conference on Disarmament*, CD/1087, 8 July 1991; "1991 Report to the Congress on the Strategic Defense Initiative," *Op. cit.*, p. 1-7.

Figure 4

Strategic Defence Initiative Architecture



Compiled and re-designed from data given in "1990 Report to the Congress on the Strategic Defense Initiative," *Strategic Defense Initiative Organization*, Washington D. C., May 1990; and elsewhere.

The elements that comprise GPALS would be deployed in stages and its present architecture include the deployment of space-based sensors and interceptors. At present, the SDI is a SD programme for research, development, testing and evaluation (RDT&E). Research has already started on four potential missions, and space weapons or weapon systems such as those based on KEW (e.g. space-based hit-to-kill vehicles to home-in on target during boost and post-boost phases - see Figures 5 and 6 - and ground-based rockets to kill targets in the midcourse and terminal phases) may be technically deployable in the late 1990s, but no decision to do so has yet been taken.[129] Furthermore, DEWs are not expected to be technically deployable before the 2020s.

Several of the USA's allies were invited to participate in the SDI research programme during the course of 1985.[130] The United Kingdom was formally invited in early 1985 and a Memorandum of Understanding (MOU) was signed in December of that year.[131] British research commitments are said to cover, inter alia, optical and electron computing, ion sources for particle beams, electromagnetic rail gun technology, and theatre defence architecture.[132] In March 1986, Germany and the USA signed two agreements related to technology, one of which was a MOU regarding the participation of German firms and research institutes in the SDI programme.[133] German participation in SDI research includes advanced technology contracts and subcontracts related to pointing and tracking, free electron laser technology, theatre defence architecture, lightweight mirrors, membrane tool technology, and optics. Italy and the USA also signed a MOU in September 1986 and, like other European countries, the research being undertaken by the Italians includes theatre defense architecture. However, countries such as Australia, Canada, Denmark, France, Greece, the Netherlands and Norway have all declined the invitation to take part in SDI research.[134]

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[129] A Presidential decision on whether SDI technology should be deployed is expected for the mid-1990s. For a detailed description of SDI development and deployment policies, see "1990 Report to the Congress on the Strategic Defense Initiative," *Op. cit.*; see also "SDI: Technology Survivability and Software," *Op. cit.*

[130] For a detailed discussion on the evolution of allied participation in Strategic Defense and Anti-Tactical Ballistic Missile Defense, see the 1990 Report to the Congress on the Strategic Defense Initiative, *Op. cit.*, pp. B1-B6. For a comprehensive and technical study on West European defence against ballistic missiles, see *SDI for Europe: Technical Aspects of Anti-Tactical Ballistic Missile Defenses*, by Jürgen Altmann, PRIF Research Report: Bochum, No. 3, 1988; see also "Strategic Defense Initiative," *Report to the Congress on The Strategic Defense Initiative*, Washington D.C., 1987, and references therein; Rüdiger Zimmermann, *Selling "SDI" to Europeans: Arguments, Metaphors and Adversary Images*, Working Paper No. 15, First Annual Conference on Discourse, Peace, Security and International Society, Ballyvaughn, Ireland, August 9-16, 1987, San Diego, La Jolla: University of California, Institute on Global Conflict and Cooperation, 1988.

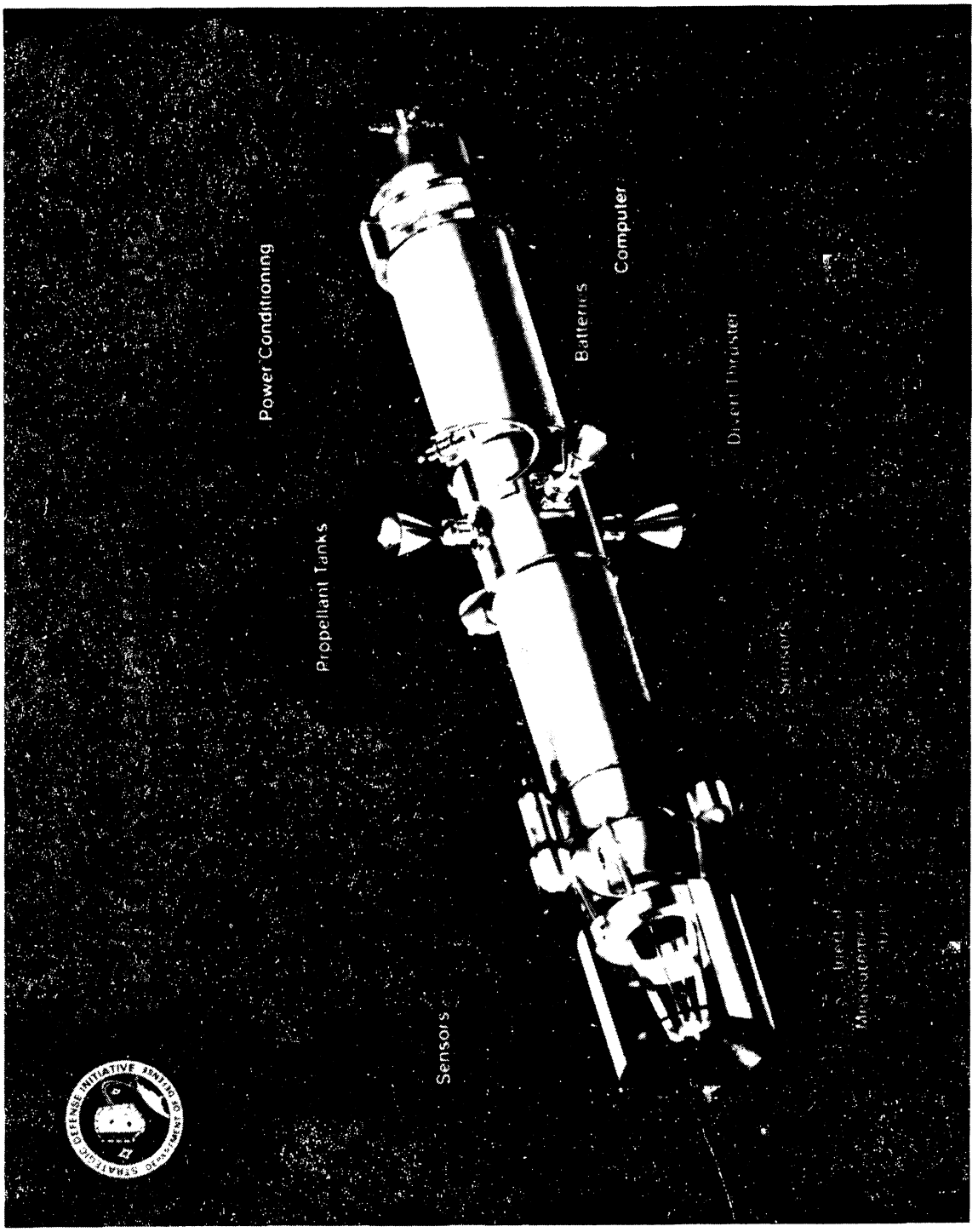
[131] For a discussion on the United Kingdom's adhesion to SDI research, see Trevor Taylor in "SDI - The British Response," in *Star Wars and European Defence*, edited by Hans Günter Brauch, Houndmills: Macmillian Press, 1987, pp. 129-149; see also, by the same author, "Britain's Response to the Strategic Defence Initiative," *International Affairs*, Vol. 62, No. 2, Spring 1986, pp. 217-230.

[132] "1990 Report to the Congress on the Strategic Defense Initiative," *Op. cit.*, p. B3.

[133] *Loc. cit.*; unauthorized copies of these agreements which were supposed to be kept secret, were reproduced in the *Kölner Express* of 18 April 1986; see also Deutscher Bundestag, *Plenarprotokoll* 10/212, 23 April 1986, pp. 16258ff-270. For a study of the general provisions of the US/German agreement on SDI research and exchange of letters between the two Governments, see *Le traité germano-américain sur l'IDS*, Bruxelles: GRIP, No. 103, November 1986, while for a review of German participation in SDI research and the sharing of technological surge generated therefrom, as well as German influence in arms control and disarmament, see "The SDI Agreement between Bonn and Washington: Review of the First Four Years," by B. W. Kubbing in *Space Policy*, August 1990, pp. 231-47; "Star Wars Controversy in West Germany," by Thomas Risse-Kappen in *Bulletin of the Atomic Scientists*, vol. 43, No. 6, July/August 1987, pp. 50-52.

[134] It is worth noting that participation in SDI research is not limited to countries which have signed an agreement with the United States. For example, French firms have been authorized by their Government to undertake SDI research under contract. Similar national arrangements have been made for firms in Belgium, Canada, Denmark and the Netherlands. For a discussion of Canadian SDI policy, see Jane Boulden, "Phase I of the Strategic Defense Initiative: Current Issues, Arms Control and Canadian National Security," *Issue Brief*, Canadian Center for Arms Control and Disarmament, No. 12, August 1990. Following a proposal by French President François Mitterrand in April 1985, a programme called Eurêka was created to assist industries and research institutions in

(continued...)



(Courtesy of SDIO/USDoD)

FIGURE 5

CONCEPTUAL DESIGN OF BRILLIANT PEBBLES INTERCEPTOR (Components)

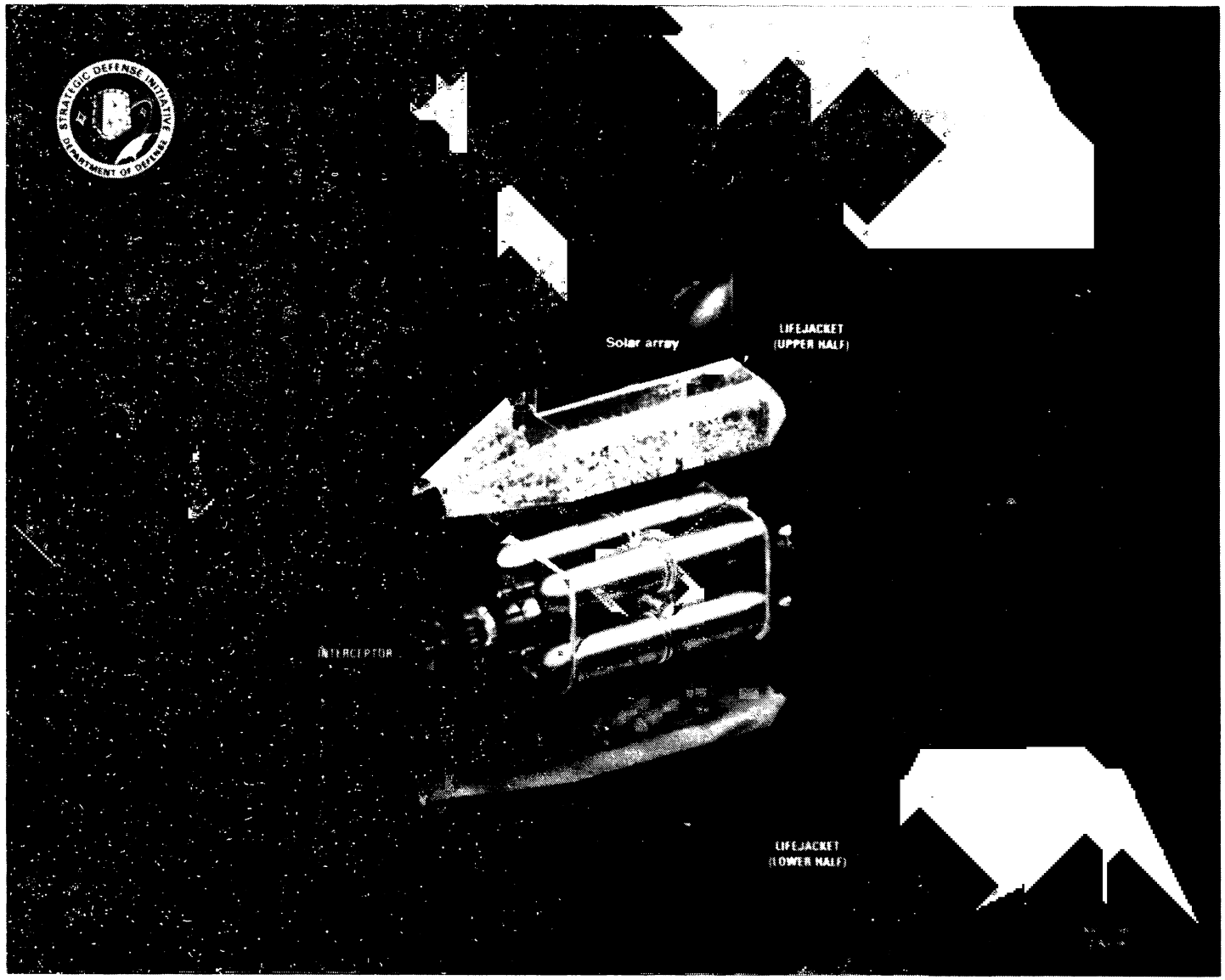
Artist's conception of a Brilliant Pebbles interceptor. Brilliant Pebbles is a boost and post-boost interceptor likely to be deployed as a space-based layer (low orbit) of SDI/GPALS. The weapons's components include integrated sensors, propellant tanks, divert thrusters, batteries, and power conditioning, inertial measurement unit, guidance, control, a computer, battle management and several thousands of singlet interceptors.

[134](...continued)
various countries of the European Economic Community, plus a few non-member countries, in conducting specific, concrete projects of technological development. Eurêka's research projects cover a vast area of technology in data-processing, materials, micro-electronics, etc. However, it is the area of high power excimer and solid state lasers which are most directly related to SDI research. See *Eurêka: Together for the Future*, Vade Mecum, Brussels; for an account of the discussion on Eurêka, see a series of articles published in *Défense Nationale*, 44e année, novembre 1988; see also Alain Carton, "EUREKA: a West European Response to the Technological Challenge posed by the SDI Research Programme," in *Star Wars and European Defence, Op. cit.*, pp. 311-327.

FIGURE 6

CONCEPTUAL DESIGN OF BRILLIANT PEBBLES INTERCEPTOR (Protecting shield)

Artist's conception of a Brilliant Pebbles interceptor. The interceptor, shown in the middle of the figure, is surrounded by propellant tanks and fits into the Life Jacket, shown above and below the interceptor. The Life Jacket protects the interceptor while in orbit. In order to accomplish an intercept, the interceptor would leave the Life Jacket and propel to the intended target.



(Courtesy of SDIO/USDoD)

Israel and Japan were also invited to take part and a memorandum was duly signed by the US and Israel in May 1986, Israel's participation being directed to propulsion, short-wave chemical lasers, and theatre defence architecture. Israel has, in fact, designed the KE-kill ARROW missile, whose flight test for the interception of a surrogate tactical ballistic missile is scheduled for 1991.[135] Japan's formal negotiations with the US, begun in 1986, led to an agreement facilitating the participation of Japanese enterprises in the SDI.[136] In addition to a study on Western Pacific theatre defense architecture, Japan is also taking part in research into computer software applications such as the *programming engineering of the architecture of programming tools*.[137] Hardware research could also be undertaken if required, but would be limited to electronic devices such as integrated circuits and large-scale integrated circuits.

It should be emphasized that all of the agreements mentioned above basically ensure equitable and genuine competition between the United States and the various national private enterprises and/or research institutes taking part in the SDI programme. However, although the work is undertaken by civilian organizations, coordination with the SDIO Multinational Programme is frequently processed through government channels.[138] Moreover, SDI partnership has been designed in such a way as to ensure multinational participation during the research phase, but any development and deployment of weapons and/or weapon systems by any country other than the United States will require legal and other decisions.

b. Soviet Union

Several defence experts believe that the Soviet Union has been involved in BMD for a long time.[139] However, since reports on this involvement are rare (and extremely sketchy) in the open literature, this gives rise to at least three conjectures. The first derives from the official Soviet stand on its involvement in ballistic missile and other strategic defence methods, the second from western detection of Soviet weapons' tests in this or related fields, and the third from western interpretation of Soviet R&D potential in BMD technology based on unofficial statements made by representatives of the Soviet military and scientific establishments.

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[135] "1990 Report to the Congress on the Strategic Defense Initiative," *Op. cit.*, pp. 4.11-12.

[136] See *Agreement Between the Government of Japan and the Government of the United States of America Concerning Japanese Participation in Research in the Strategic Defense Initiative*, Tokyo, July 22, 1987; for a discussion of Japan's policy on SDI, see Peggy L. Falkenheim in "Japan and Arms Control: Tokyo's Response to SDI and INF," *Aurora Papers*, No. 6, Ontario: The Canadian Center for Arms Control and Disarmament, 1987; Elpidio R. Sta. Romana, "Japan, SDI and the Pacific," *Foreign Relations*, pp. 105-123.

[137] On advanced dual-purpose Japanese technology (e.g., computer, electro-optics, and lasers having applications in the SDI), see Emura Yoshiro, "What Technology Does the U.S. Want?," in *Japan Quarterly*, July-September, 1986, pp. 238-43. On the involvement of Japanese industry in the SDI fact-finding mission and its participation in SDI research, see "The Politics of Participating," by Takase Shoji, in *Japan Quarterly*, July-September, 1986, pp. 244-51; for an opinion on the USA's persuasion of Japan to join SDI research and the potential long-term implications, see D. Petrov, "Japan and Space Militarization Plans," *International Affairs*, June, 1986, pp. 56-64.

[138] It should be mentioned, however, that other agreements - e.g., Memorandum of Agreements (MOA) - have also been signed by the Israeli Ministry of Defence in 1988, the United Kingdom Ministry of Defence in 1989, and the French Ministry of Defence in 1990.

[139] See "The Soviet ballistic missile programme," by Sayre Stevens in *Ballistic Missile Defense, Op. cit.*, pp. 182-220 and references therein. For a general description of Soviet BMD capability, see various issues of *Soviet Military Power* since 1981. On criticism of US appreciation of this capability, see Bunn, *Op. cit.*, pp. 48-55.

With regard to the first conjecture, during a television interview with an American network in 1987, President Gorbachev made the following statement about R&D on SD and related technology:

> ...let me just react to your remark that the Soviet Union is engaged in things similar to SDI.
>
> Well, it is really hard to say what the Soviet Union is not doing; the Soviet Union is practically doing everything that the United States is doing.
>
> I'd say we are engaged in research, basic research, which relates to these aspects which are covered by SDI in the United States. But we will not build an SDI, we will not deploy SDI, and we call on the United States to act similarly.[140]

However, the official Soviet stand in respect of SD is that any system of defence against ballistic missiles should be confined to the permitted developments and imposed limits of the ABM Treaty.[141] Therefore, the Soviet Union opposes any transition to SD which goes beyond the deployment of an ABM system as agreed in 1972.

In regard to the second conjecture, some observers - particularly those who are vigorous proponents of SDI technology - argue that the Soviet Union has a significant SDI-type programme.[142] Other more moderate observers, however, generally tend to regard Soviet SD effort as being fundamentally different from its US counterpart. Conceptually, as well as technically, Soviet SD effort is not seen as a large-scale organized defence architecture, but is described as being composed of various defensive measures such as the following:

- Ground Segment;
  - Civil defence
- Air Segment;
  - Defences to counter bombers
  - Defences to counter cruise missiles
- Space/Ground Segments;
  - Early warning
  - ABM system modernization
  - ASAT weapons.[143]

The measures with significant implications for an arms race in outer space would of course be those involving weapons or weapon systems with a potential use in a BMD system. One such measure is believed to be the upgrade of the Soviet exo-atmospheric Galosh ABM system from a single to a two-layer intercept technology, despite the widespread belief in Soviet conformity with the ABM Treaty.[144] Another measure is the Soviet research on KEWs which is usually described as being intended for both ABM

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[140] Interview of Mr Mikhail Gorbachev by NBC, *Pravda*, 2 December 1987.

[141] "Statement submitted by the Union of the Socialist Soviet Republics to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 553, 19 April 1990, pp. 14-15.

[142] See, for example, *Soviet Military Power*, 1981.

[143] Bunn, *Op. cit.*, pp. 48-55; some of these measures are also discussed, to some extent, in different issues of *Soviet Military Power* which has been published annually since 1981; see also an assessment of SDI and Soviet *countermeasures* to a large-scale BMD made by a group of Soviet scientists in *Weaponry in Space: The Dilemma of Security, Op. cit.*

[144] *Ibid.*

and ASAT capability. Indeed, speculation deriving from the detection and monitoring of Soviet tests presumes that the USSR has some kind of ASAT capability, which is at presently limited to low-altitude ranges, and a co-orbital and pellet-warhead anti-satellite[145] capability.[146] In respect of DE weapons, the United States has stated that Soviet capability includes "...high-energy lasers at their Sary Shagan test range [which] have the capability of damaging satellites in orbit."[147]

The third conjecture is the western perception of Soviet research on direct-ascent nuclear anti-satellite weapons (DANASATs) with multiple decoys. For example, US sources estimate that the Soviet Union will have the technical capability for the deployment of these weapons by the mid-1990s. Further speculation is advanced by SDIO in its postulate that Soviet ABM is also DANASAT-capable. Moreover, speculation on Soviet laser technology research is frequently coupled with ballistic missile defence research, since both include DEWs capable of striking objects within and outside the atmosphere. One example mentioned in the open literature is the Soviet research on advanced ABM concepts such as UHF [Ultrahigh Frequency] weapons for ballistic missile defences.[148] In its exo-atmospheric character, this research area covers both missile and ASAT strike capable devices.

Furthermore, there have been sporadic reports of Soviet capability for R&D on SD in the Soviet press, when Soviet officials and eminent scientists have openly commented on, inter alia, the country's research regarding "...lasers and linear accelerators suited to creating kinetic and particle-beam weapons, and radio-frequency systems capable of disabling satellites' electronics."[149] Such statements are taken seriously by the United States which, in commenting on Soviet interest in SD, has said that "... it is capabilities rather than declared intentions that count"[150].

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[145] A pellet-warhead is a device based on the kinetic-kill principle, the warhead of an interceptor satellite being charged with several metal pellets which are projected towards a targeted object in space, destroying or damaging it on impact.

[146] The new generation of Soviet interceptors in question is believed to be composed of exo-atmospheric missiles (SH-04) and hypersonic endo-atmospheric missiles (SH-08). For a general discussion on this matter, see, for instance, to David Holloway's article entitled "The Strategic Defense Initiative and the Soviet Union," in *Weapons in Space*, *Op. cit.*, pp. 257-78, and references therein; see also Stares, "US and Soviet Military Space Programs: A Comparative Assessment," *Op. cit.*

[147] CD/PV 349, *Op. cit.*, p. 12 (USA); other statements describing the US view of Soviet research into advanced technologies for SD include "...technologies in support of high-energy lasers, particle-beam weapons, and radio-frequency weapons." See CD/PV 321, *Op. cit.*, p. 9; and "Statement submitted by the United States of America to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 386, 5 February 1987, pp. 6-7; "Statement submitted by the United States of America to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 402, 2 April 1987, p. 32. See also Holloway, *Op. cit.*; "Soviets Accelerate Missile Defense Efforts," *Aviation Week & Space Technology*, January 16, 1984, pp. 14-16; Hans Günter Brauch, "SDI - a Reaction to or a Hedge Against Soviet BMD Projects: Soviet Military Space Activities and European Security," in *Star Wars and European Defense, Op. cit.*, pp. 51-126.

[148] See an interview with the Soviet ABM designer Grigoriy Kisunko in *Sovetskaya Rossiya*, 5 August 1990, quoted in "Recent Soviet Comments on Military Space and ABM Activities," *US Delegation to the Nuclear and Space Talks*, Geneva, 1990.

[149] E. Zirnov, *Komsomolskaya Pravda*, 24 October 1990, extract translated and quoted in "Recent Soviet Comments on Military Space and ABM Activities," *US Delegation to the Nuclear and Space Talks, Op. cit.*, p. 2.

[150] "Statement made by the United States of America to the Conference on Disarmament," *Conference on Disarmament*, CD/PV. 523, 3 August 1989, p. 19.

c. Criticism of Strategic Defence[151]

Strategic Defence has been a very controversial issue from its inception when research and deployment of defences against ballistic missiles involved only ABM systems. The introduction of the SDI programme has exacerbated this controversy, even more so perhaps than discussion on Soviet potential and real efforts towards BMD. The reasons are not so new given the transparency of US engagement in SDI and the multi-partner character that has developed under the SDIO and its multinational programme. Nevertheless, profounder reasons for criticizing SD seem to emanate from the development and deployment of a large architecture, consisting of ballistic missile defence and its space-based components and new weapons technologies, which could be a factor in triggering an arms race in outer space. In fact, criticisms of SD can be grouped into three distinct topics for discussion: (1) technological drawbacks, (2) political/military implications, and (3) legal ramifications.

Technological drawbacks deriving from the practical application of a large-scale SD system have been enumerated and criticized on several grounds, the major concern being the dubious technological feasibility of a large SD system[152] because of the inherent potential for inaccurate appreciation of a defensive system. The criticism here is directed towards the reliability of an SD system to cope with battle management requirements. Technological instability would run contrary to the original objectives of SD planning, and it is precisely this potential instability, caused by the emergence of new technologies, that is the subject of much debate at the CD. However, technological uncertainty has also generated other concerns. For example, France has pointed out that a situation in which both of the major powers would avoid all means of second strikes, without absolute certainty as to the efficiency of such circumvention, "...would be fraught with danger".[153] Another French observation is that an uncontrollable automatization of political decisions might result from the technology involved in an SD system.[154]

The principal political/military implication for international security is, of course, the real or perceived extension of an arms race into outer space, an implication which could be twofold: a qualitative extension in terms of new weapons and weapon systems and a quantitative extension increasing offensive missile forces to overcharge the opponent's BMD system. In both instances, the deployment of substantial numbers of manoeuvring re-entry vehicles and sophisticated decoys are not the only possible consequences. Delegates to the CD have also stressed the eventuality of SD development

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[151] For a comprehensive unclassified US study on some aspects of the following discussion, see "SDI: Technology Survivability and Software," *Op. cit.*; see also Kubbing, *Loc. cit.*; on Soviet sources, see *Star Wars: Delusions and Dangers, Op. cit.*; Chernyshev, *Op. cit.*

[152] One point concerns the software system required by such a multifarious integrated programme architecture. It is argued that the present state-of-the-art of computer software does not permit complex software systems to include all four launch phases of a ballistic missile - boost, post-boost, midcourse, and terminal phases. Such a system would demand the development of adequate models of *real* or *near-real* dynamic analysis of battle management and corresponding tests and maintenance of full-scale speedy decision-making BMD engagements. It its also argued that such a system would require significant technological advance, particularly for the system's component of population defence, which would in turn demand deployments of kinetic and/or directed energy space and ground-based weapons which are technically inconceivable at least in the near future. Some of these criticisms are advanced by David L. Parnas and Danny Cohen, in "SDI: Two Views of Professional Responsibility," *IGCC Policy Papers*, No. 5, La Jolla, CA: IGCC, 1987; see also George Hutchinson in "Software Aspects of SDI," *Strategic Defence and the Future of the Arms Race, Op. cit.*, pp. 92-95; John A. Jüngerman, *The Strategic Defense Initiative: A Primer and Critique*, San Diego: University of California Institute on Global Conflict and Cooperation, 1988, pp. 22-23.

[153] CD/PV 263, *Op. cit.*, p. 20; also see CD/PV 303, *Op. cit.*, pp. 14-15.

[154] CD/PV 263, *Op. cit.*, p. 20.

fostering an arms race on non-space weapon systems, i.e., submarine and/or air-launched missiles: "...each Power would seek to saturate the anti-ballistic missile systems planned by the other and to multiply its non-ballistic delivery vehicles (such as cruise missiles)."[155] As well as supporting this view, the Swedish delegation also called attention to yet another major eventuality which is even more directly related to the space segment of SD - the development and deployment of ASAT weapons[156] - and in fact this seems to be the main area of concern in the outer space arms issue. In this connection, a 1988 report of the US Office of Technology Assessment (OTA) concluded that should the United States or the Soviet Union begin:

> ...to deploy substantial numbers of BMD weapons on the ground or in space, these weapons would greatly increase the anti-satellite threat to the other's space assets. (Space-based weapons themselves would, of course, be among those space assets.) Neither side is liable to permit the other the kind of unilateral control of space that such unchallenged ASAT capabilities would provide. **Therefore, in the absence of arms control agreements to the contrary, we should expect from the beginning of the BMD space deployments an intense competition between the superpowers for control of near-earth space.**[157]

Criticism of BMD is also to be found in the argument regarding the number of participants in the arms race, which runs on from the increased number of states taking part in the global or regional BMD architecture of SDI-related research. Over and above any arms race implications, deployment of SD does not eliminate political/military instability during and after the deployment phases.[158] The operation of some advanced BMD weapons with the intention of destroying enemy ICBMs in their boost-phase has also been quoted as another cause of instability, particularly in regard to the notion of X-ray lasers in "pop-up" mode being launched by US submarines close to Soviet territory. Lasers of this kind would require a nuclear explosion which the Soviet authorities could mistake for a first-strike nuclear attack.[159]

Yet another aspect of the political/military instability that BMD development could provoke was brought to light by East European observers who noted that, by virtue of its space-based weapon systems' capability, SDI could also be an offensive system if used to perform the function of ASAT weapons or a space-to-ground strike.[160] Furthermore, there is no certainty that regional SD programmes would provide any more

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155 CD/PV 263, *Op. cit.*, p. 20; see also a longer discussion in CD/PV 301, *Op. cit.*, pp. 18-19 (Sweden).

156 CD/PV 301, *Op. cit.*, p. 19.

157 "SDI: Technology, Survivability and Software," *Op. cit.*, p. 27, emphasis on original; see also Ashton Carter "ASAT and BMD," *Op. cit.*, pp. 100-101.

158 One way of addressing the instability question was put forward in a proposal for a Defence and Space Treaty which was tabled by the USA on 5 December 1989 in Geneva. This referred to the implementation of Confidence-Building and Predictability Measures which could provide for some degree of openness between the US and the Soviet SD programmes, as well as the establishment of cooperative transition for the period such a system is deployed. See "Statement submitted by the United States of America to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 553, April 19, 1990, pp. 3-10; see also "The Defence and Space Talks," *U.S. Delegation to the Nuclear and Space Talks*, Geneva, 1990. For the Soviet Union's viewpoint, see "Statement made by the Union of the Soviet Socialist Republics to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 523, 3 August 1989, pp. 5-9.

159 For more technical details, see Jüngerman, *Op. cit.*, pp. 20-21; also see Ashton Carter, "The Relationship of ASAT and BMD Systems," *Op. cit.*, pp. 177-78.

160 CD/PV 303, *Op. cit.*, p. 21 (GDR); see also similar criticism in *Space Strike Arms and International Security*, Report of the Committee of Soviet Scientists for Peace Against the Nuclear Threat, Moscow, 1985.

political/military stability than the stability claimed for the US SDI. In fact, in the 1980s the Eastern European countries regarded the implementation of an European Defense Initiative (EDI) in Western Europe as a very dangerous measure indeed.[161]

As to the legal repercussions, these could be the abrogation or renegotiation of the bilateral ABM Treaty and perhaps also the multilateral Outer Space Treaty. While the deployment of second and third SDI missions might result in the abrogation or renegotiation of the ABM Treaty, the SDIO maintains that a Hedge Mission would be consistent with this Treaty because it would not actually deploy SD weapons. This is also argued in respect of the initial stage of the planned SDI *Administration mission*, when only space/ground-based infra-red sensors are to be deployed, although SBIs [Space-Based Interceptors] on carrier satellites and the ground-based ERIS [Exo-Atmospheric Interceptor System] are scheduled to be used on completion of SDI phase I.[162] Meanwhile, President Bush has confirmed that the SDI programme will continue in full compliance with the ABM Treaty.[163] Most delegations to the CD have recognized that abrogation of the ABM Treaty would be detrimental both to USSR/US relations in particular and to international security in general. As Pakistan has emphasized, "[w]ithout these [ABM] restraints, there would be an unrestrained arms race in both offensive and defensive systems."[164]

Another conjectured legal implication of SD is the deployment and use of nuclear devices in space weapons, a hypothetic example being the US deployment of nuclear-produced X-ray lasers in outer space to which attention was drawn by the Mongolian delegation,[165] since it would "... jeopardize the observance of the international treaties and agreements that are in force...".[166] Other observers have argued for instance that Japan's participation in the SDI programme would raise a number of national and international legal implications, the major areas of controversy being as follows:

- infringement of the 1969 resolution of the House of Representatives which proclaimed that Japan's exploration of and exploitation of outer space should be restricted to exclusively peaceful purposes;
- infringement of the Japanese Space Act on the exploration and exploitation of outer space;
- conflict with the three non-nuclear principles proclaimed by the government in 1971 (Japan will not manufacture or possess nuclear weapons or bring them to its territory)

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161 "Letter dated 3 April 1986 Addressed to the President of the Conference on Disarmament by the Chargé d'Affaires of the Permanent Mission of Poland Transmitting the Text of the Communiqué of the Meeting of the Committee of the Ministers of Foreign Affairs of the States Parties to the Warsaw Treaty held in Warsaw on 19-20 March 1986," *Conference on Disarmament*, CD/686, 4 April 1986; "Statement submitted by the German Democratic Republic to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 425, 28 July 1987, p. 12; also see "Statement submitted by the Egypt to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 389, 19 March 1987, p. 30.

162 The ground-based ERIS interceptor entered the test mode when it was launched on 28 January 1991 from the US Army site on Kwajelein Atoll in the Pacific Ocean to counter a Minuteman 1 ICBM, which was itself launched from the Vandenberg AFB in California. Reports indicate that the ballistic re-entry vehicle was destroyed in space. See "Army Eris Interceptor Destroys Dummy Warhead in SDI Test," by James R. Asker in *Aviation Week & Space Technology*, February 4, 1991, pp. 22-3.

163 "1990 Report to the Congress on the Strategic Defense Initiative," *Op. cit.*, pp. 1.4-1.5.

164 "Statement submitted by Pakistan to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 413, 16 June 1987, p. 21.

165 CD/PV 233, *Op. cit.*, pp. 7-8.

166 *Loc. cit.*

- violation of the Treaty on the Non-Proliferation of Nuclear Weapons, which prohibits nuclear weapons-related research;
- violation of the Outer Space Treaty;[167]

However, statements by Japanese Prime Minister Nakasone in the Diet have reaffirmed the country's commitment to the three non-nuclear principles in the context of its SDI research, as well as Japan's intention to implement this research within the framework of the national Constitution and the 1969 House of Representatives' resolution mentioned above.[168] Thus, it is clear that SD research and development are of not inconsiderable relevance to an arms race in outer space.

The last section of this chapter will be devoted to the relationship between bilateral and multilateral efforts in the field of outer space.

C. Linkage Between Bilateral USSR/US Initiatives and Multilateral Initiatives

One of the main disarmament discussion themes at Geneva is the relationship between, on the one hand, bilateral initiatives and, on the other, multilateral and bilateral initiatives to prevent an arms race in outer space. Some delegations to the *Ad Hoc* PAROS Committee have accentuated the "...close interdependence and complementarity between bilateral and multilateral efforts",[169] and several reports of the that Committee have called attention to the "...general recognition of the importance of bilateral negotiations between the Union of Soviet Socialist Republics and the United States of America" stressing "... that bilateral and multilateral efforts [are] complementary".[170]

However, other statements made at the CD and its *Ad Hoc* Committee show a certain ambiguity as to the relationship between bilateral and multilateral talks. Some delegations argue that progress in the Committee's work is largely dependent on bilateral negotiations, because the links between the ASAT and ABM systems form an integral part of those negotiations, especially in view of the quasi-monopoly held by the USSR and the USA in this area.[171] Others have suggested that these bilateral discussions are

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[167] Petrov, *Op. cit.*, pp. 61-62.

[168] Stated in *Loc. cit.*

[169] CD/PV 543, *Op. cit.*, p. 17 (Venezuela). Several delegations believe that, given a positive outcome, bilateral USSR/US negotiations can have a significant effect on the work of the *Ad Hoc* Committee itself; see also statements in "Letter dated 20 February from the Leader of the Delegation of Mexico to the Special Representative of the Secretary-General to the Conference of the Committee on Disarmament, *Conference of the Committee on Disarmament*, CCD/394, 20 February 1973.

[170] See for instance CD/1034, *Op. cit.*, p. 4 (Report of the *Ad Hoc* PAROS Committee). In similar vein, discussions in the First Committee of the General Assembly and subsequent Assembly resolutions have often urged the Soviet Union and the United States to "...pursue intensively their bilateral negotiations in a constructive spirit aimed at reaching early agreement for preventing an arms race in outer space, and to advise the Conference on Disarmament periodically of the progress of their bilateral sessions so as to facilitate its work." (See A/RES/44/112, *Op. cit.*, p. 5.) Nevertheless, this recognition that bilateral negotiations "...could facilitate the multilateral negotiations for the prevention of an arms race in outer space..." has often referred explicitly to provisions "...in accordance with paragraph 27 of the Final Document of the Tenth Special Session" (A/RES/43/70, *Op. cit.*, p. 3). Paragraph 27, however, recalls that one of the United Nations' statutory duties is to play the central role and to have the primary responsibility in the sphere of disarmament. The perception of the role of bilateral negotiations is therefore that of a meaningful means of achieving a larger objective - general and complete disarmament. This relationship is further explained by the emphasis placed on the *mutual complementary nature of bilateral and multilateral efforts.*

[171] See "Statement Submitted by France to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 570, 2 August 1990, p. 11; see also "Statement Submitted by France to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 518, 18 July 1989, p. 5.

mostly concerned with the two countries' politico-military relationship and/or weapons and weapon systems specificity. For example, it has been pointed out that the talks are limited to ABM Treaty issues and bear little relation to the aim of the *Ad Hoc* Committee.[172] This argument has been further elaborated by France in its statement that "no multilateral regulation exercise aimed at prohibiting the permanent placing of weapons in space could advance independently of the United States-Soviet bilateral negotiations or, a fortiori, more rapidly than those negotiations".[173] In contrast, a number of delegations have maintained, at both the CD and the *Ad Hoc* Committee, that, while bilateral initiatives are important, the CD is the proper body to negotiate a multilateral agreement on the prevention of an arms race in outer space and that emphasis should be placed on the efforts being made in that forum.[174] This argument is also reinforced by a desire not to leave the regulation of outer space and the prevention of an arms race in that environment entirely to bilateral agreement at a time deemed to be appropriate by the Soviet Union and United States.

It is the Geneva-based Defence and Space Talks (DST) - which are held between the Soviet Union and the United States within the framework of the Nuclear and Space Talks (NST)[175] - that have had the most impact on the *Ad Hoc* Committee's own discussions. These talks are similar to but more comprehensive than the SALT negotiations in that the DST/NST agenda demonstrates the desire to discuss the relationship between strategic offensive and defensive arms and the development of new technologies.[176]

At present, the DST/NST are centred on the US proposal for a Defence and Space Treaty which incorporates a number of the issues before the *Ad Hoc* Committee, but it is often difficult to avoid duplication of this kind. Table VI gives a list of the general topics under bilateral and multilateral discussion, thereby showing the potential for similitude and for complementarity or conflict between these initiatives.

Quite apart from the overlapping shown in Table VI, one of the most important differences between these bilateral and multilateral discussions is the fundamental approach on which they are based: in other words, PAROS is a preventive forum while the DTS/NTS are concerned with arms limitation. Furthermore, the purposes and objectives of the USA and the USSR are not identical. Hence, because today's strategic balance relies almost exclusively on nuclear offensive weapons, the aim of the United States in the DST/NST is said to be that of facilitating "...a co-operative transition to a more stable deterrence which relies increasingly on non-nuclear defences against strategic ballistic missiles, should they prove feasible".[177] The United States has stated that it intends to ensure full legal rights for the testing of advance defensive technologies as is, it claims, allowed in the ABM Treaty. Moreover, the United States has also said that its

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[172] See CD/954, *Op. cit.*, p. 5 (Report of the *Ad Hoc* PAROS Committee).

[173] "Letter Dated 20 July 1989 from the Representative of France Addressed to the Secretary-General of the Conference on Disarmament Transmitting a Working Paper Entitled 'Prevention of an Arms Race in Outer Space: Proposals Concerning Monitoring and Verification and Satellite Immunity'," *Conference on Disarmament*, CD/937, 21 July 1989, p. 2.

[174] *Loc. cit.*

[175] The Nuclear and Space Talks (NST) are Geneva-based bilateral negotiations on intermediate and strategic nuclear forces, plus defence and space matters. However, the Soviet Union does not use the term "defence" and its statements on space and space-related discussions with the United States are made under the general heading of NST.

[176] *Joint Statement on the Future Negotiations on Nuclear and Space Arms and Further Enhancing Strategic Stability*, Washington D.C.: United States Arms Control and Disarmament Agency, 1 June 1990.

[177] CD/PV 553, *Op. cit.*, pp. 7-10; see also an article by David J. Smith entitled "The Defence and Space Talks: Moving towards Non-nuclear Strategic Defences," in *Nato Review*, No. 5, October 1990, pp. 17-21; CD/1087, *Op. cit.*, pp. 4-5.

TABLE VI

Major Issues Debated in Bilateral and Multilateral Attempts to Prevent an Arms Race in Outer Space[¶]

MAJOR ISSUES OF DISCUSSION	BILATERAL LEVEL		MULTILATERAL LEVEL
	Discussion/Negotiation		Discussion
	ASAT[§]	DST/NST	PAROS
• Definitions (including new technology)			
•• Space Weapons	Yes	Yes	Yes
•• Space Capable Ground-Based Weapons	Yes	Yes	Yes
• Prohibition of Space Weapons (including those in a defensive architecture mode)			
•• Test	Yes	Yes	Yes
•• Deployment	Yes	Yes	Yes
• International Legal Régime	-	No	Yes
• Confidence-building Measures			
•• Transparency of			
••• Strategic Ballistic Missile Defence	-	Yes	No
••• Weapons Test		Yes	No
•• Cooperative Measures		Yes	Yes
• Verification			
•• National Technical Means	Yes	Yes	No[§§]
•• Cooperative Measures		Yes	Yes
•• On-site Inspections	-	Yes	Yes
• Period of Effort	1978-1979[§§§]	1985-	1985-
• Fundamental Principle			
•• Preventive	Yes	Yes/No[§§§§]	Yes
•• Arms Limitation		Yes	Yes
•• Disarmament		No	No[§§§§§]

¶= The table is limited to talks on either space weapons or their components, and does not include discussions on weapons travelling through space such as the Strategic Arms Reduction Talks (START).

ASAT = Anti-Satellite; **DST** = Defence and Space Talks; **NST** = Nuclear and Space Talks; **PAROS** = Prevention of an Arms Race in Outer Space. **§** = Suspended; **§§** = Some proposals to the *Ad Hoc* Committee do consider the use of NTMs; **§§§** = Talks were interrupted during this period; **§§§§** = Fundamental differences exist between Soviet and US objectives; **§§§§§** = Some delegations argue that PAROS discussions must include disarmament measures in respect of ASAT or ASAT capable weapons or weapon systems*

purpose in conducting these talks with the Soviet Union is also to seek to "...free space-based ABM radars and their substitutes from outdated ABM Treaty limits", thus ensuring the future deployment of space weapons and components designed for defence against ballistic missiles.[178]

[178] *Ibid.*, p. 7; CD/1087, *Op. cit.*, p. 5 (USA).

The Soviet objective in the DST/NST is quite the reverse,[179] and does not support the United States' position that the talks should provide a period of transition followed by a situation which is more precisely directed to defence. Opinion also differs in regard to the proposed confidence-building and predictability measures. The latter have been proposed by the United States for the development of its strategic relationship with the Soviet Union, but the Soviet Union has endorsed the usefulness of such measures only when they are aimed at "...enhancing trust and guaranteeing the confidence of the parties in the fact that the obligations they assumed under the ABM Treaty are being complied with".[180] The Soviet Union subscribes to the idea that there is an objective interrelationship between strategic offensive and defensive arms, and it consequently alleges that the deployment of large-scale ground- and space-based ABM systems would inevitably lead to a qualitative and quantitative build-up of strategic offensive arms, thus resulting in a new arms race. The Soviets have stated that their aim in the DST/NST is not concerned simply with the preservation of the ABM Treaty as it stands, but also to ensuring its strengthening, which clearly demonstrates the divergency of conceptual interest between the two powers.

This guide would certainly be incomplete if it failed to mention the views of the two bilateral parties on multilateral negotiations. Although the USA does participate in the *Ad Hoc* Committee's discussions, it nevertheless placed priority on the bilateral negotiations when it stated that a "...fundamental framework must be first established on a bilateral level..." before substantial negotiations are started on the multilateral one.[181] For years, the official US stand has been that the country has neither identified nor been able to table any proposals in the multilateral forum which are feasible, desirable and verifiable.[182] Furthermore, the Untied States has also declared that it is "...not able to accept calls for multilateral negotiations in this area".[183]

However, unlike the United States, the Soviet Union has identified some areas where multilateral negotiations could be conducted at the PAROS,[184] and has submitted a series of proposals to the *Ad Hoc Committee* which support a ban on the development and deployment of arms in outer space. Nevertheless, as far as negotiations in the near future are concerned, the Soviet Union officially favours the idea that these should begin with the less military-sensitive and more easily acceptable political issues such as confidence-building measures in outer space, its position being:

> ...to build up experience with constructive multilateral work as regards the outer space dimension of security and stability. However important the bilateral Soviet-American negotiations are, multilateral efforts are vital here, because an increasing number of States are becoming involved in space activities.[185]

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[179] See CD/PV 523, *Op. cit.*, pp. 6-9 (USSR); CD/PV 553, *Op. cit.*, pp. 14-15 (USSR); CD/1087, *Op. cit.*, p. 6 (USA).

[180] CD/PV 553, *Op. cit.*, p. 15.

[181] CD/PV 523, *Op. cit.*, p. 23.

[182] For brief references to this official stand, see "Statement submitted by the United States of America to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 542, 13 March 1990, p. 4.

[183] CD/PV 542, *Op. cit.*, p. 4.

[184] "Statement submitted by the Union of the Soviet Socialist Republics to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 560, 28 June 1990, pp. 11-12.

[185] CD/PV 560, *Op. cit.*

In conclusion, it is generally recognized at the CD that bilateral talks on space matters are not only an important positive initiative for the USSR/USA relationship, they are also significant in that they are expected to pave the way for multilateral negotiations. Nevertheless, it has been emphasized that the very nature of the Soviet-US effort limits the scope and objective of these countries' understanding of the prevention of an arms race in outer space and that consequently bilateral negotiations cannot serve as a substitute for the multilateral discussions held under the auspices of the *Ad Hoc* PAROS Committee.

The point at which interdependence and complementarity meet is not appreciated by all delegations to the same degree as far as the DST/NST-PAROS endeavours are concerned, nor is there consensus on the role of the *Ad Hoc* Committee in respect of the timing of further discussions on the prevention of arms race in outer space as shown by the USA's failure to support the idea that the *Ad Hoc* Committee should change its mandate. Moreover, if and when these negotiations should start, one of the most difficult tasks will be the circumvention of conceptual and practical differences *vis-à-vis* the DST/NST and, ultimately, the assessment of their compatibilities. While the purpose of the *Ad Hoc* Committee's discussions is to prevent the development and deployment of weapons, it has been said that, to a large extent, this is precisely what one partner in the DST/NST seeks to permit. Complementarity is thus ambiguous and difficult to achieve, leaving ample room for the situation whereby one negotiation is likely to hamper another, a situation which several delegations have understandably said they wish to avoid.[186]

[186] CD/1034, *Op. cit.*, p.4 (Report of the *Ad Hoc* PAROS Committee); "Survey of International Law Relevant to Arms Control and Outer Space," Submitted by Canada to the *Conference on Disarmament*, CD/618, 23 July 1985, p. 1; CD/PV 502, *Op. cit.*, p. 2 (Germany); "Statement submitted by Bulgaria to the *Conference on Disarmament*, CD/PV 512, 27 July 1989, p. 17.

CHAPTER II: LEGAL STATUS OF MILITARY ACTIVITIES IN OUTER SPACE

Although there are several international agreements on outer space, not all of them are directly pertinent to the prevention of an arms race in that environment. However, attempts have been made in the CD, in the form of working papers, to examine the agreements which do contain provisions which are of interest to the *Ad Hoc* Committee's work.[1] On the other hand, no examination of national legislations has been presented in that forum. Such an appraisal would highlight the way in which national legislation reflects a country's interpretation of certain controversial provisions in international law. However, it is possible to evaluate individual governmental standpoints from working papers and the statements of delegates submitted to the CD.

A number of international agreements which explicitly limit or prohibit the use of arms in outer space, or contain references to military-related utilization of that environment, have been examined and discussed by the CD and the *Ad Hoc* Committee. Some of these agreements are still in force, while others are not legally binding - for example, the bilateral USSR/USA SALT agreements. This reflects the view that any endeavour to prevent an arms race in outer space must be preceded by a review of all the agreements in force, plus any unratified, outdated or superseded instruments which have a bearing on any space activity, military-related or otherwise.

The CD has also scrutinized certain provisions in the United Nations Charter, the Outer Space Treaty, the bilateral USSR/US ABM Treaty, the PTB Treaty, and the Moon Agreement to see what effect they might have on the military use of outer space. However, many of the key words and terms are not clearly defined, with the result that there is no universal interpretation of their meaning. The extensive development of new weapons and weapon systems has further complicated the matter as may be seen, for example, in the case of the United Nations Charter and the Outer Space Treaty where one of the problems is the interpretation of such terms as *peaceful uses* (of outer space), *non-aggressive* and *non-military*. However, the review given here will be confined to the military aspects of positive law as discussed at the CD. A more comprehensive analysis in which implications other than military are also considered may be found in the studies undertaken by COPUOS.

One of the instruments being examined by the CD and *Ad Hoc* PAROS Committee is the USSR/US ABM Treaty. This is generally accepted by the international community as a significant restraint on the outer space arms race, but there is concern about its interpretation and observance, and this has prompted a number of proposals that its scope should be widened. Another example is the controversy over the Moon Agreement. The fact that most of the space-capable countries have still to ratify it is considered by some delegations as a significant element in ascertaining the role of the Moon Agreement in the legal régime on outer space.

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[1] See, for example, "Survey of International Law Relevant to Arms Control and Outer Space," submitted by Canada to the *Conference on Disarmament*, CD/618, 23 July 1985; CD/933, *Op. cit.* (GDR); see also *Disarmament: Problems Related to Outer Space, Op. cit.*, pp. 108-16; and an article entitled "International Law Regarding Outer Space: An Overview," by Joseph A. Bosco in *Journal of Air Law and Commerce*, Spring 1990, pp. 609-651.

The 1960s and 1970s saw the development of monitoring and verification procedures, as contained in the 1967 Outer Space Treaty, the 1977 ENMOD Convention,[2] and the 1979 Moon Agreement. The procedures laid down in the first two of these are non-mandatory and couched in rather general terms, while the provision in the 1979 agreement is much more stringent, although limited. A review of the legal scope of monitoring and verification is therefore seen by several delegations as a prerequisite for the establishment of such procedures or machineries in the prevention of an arms race in outer space - whether developed within the framework of the United Nations or under the umbrella of an independent agency.

Another important factor in any assessment of the lawfulness of military activity in outer space is the development of international custom. This is not often discussed at the CD, nor will it be considered at length in this guide. Nevertheless, international practice in the application of agreements on arms limitation and disarmament in outer space may well become a subject of future debate, so that more time may have to be allocated to provisions which are likely to become customary international law or which may make an indirect contribution to the prevention of an arms race in outer space. A specific example is international practice in respect of satellite immunity (although most delegations are in fact more interested in the development of conventional law).

A further area of concern is the linkage between agreements on arms limitation in outer space and agreements dealing with outer space in general. Some delegations feel that the scope of the latter should be widened to include additional security-related provisions. However, this type of amendment to an agreement's objective and purpose will largely depend on whether future negotiations will be concerned with a comprehensive treaty, a weapons-specific agreement, or simply confidence-building measures.

Accordingly, this chapter reviews the different international legal instruments applicable to outer space, first by analyzing the terminology in order to determine the status of positive law on outer space, and secondly by highlighting the legal provisions and procedures which could be used as guidelines when new treaties on military activity in outer space are drafted. The chapter will thus enumerate (a) the interpretation given to international space law by various delegations to the CD and the *Ad Hoc* PAROS Committee and (b) the new agreements or treaties they would support in the enforcement of relevant positive law in the prevention of an arms race in outer space.

A. International Agreements containing Provisions applicable to Arms Limitation and Prohibition in Outer Space

1. Charter of the United Nations, 1945

Several of the working papers on international law and its relevance to the PAROS which the CD has considered have drawn particular attention to the Charter of the United Nations because of its dual role in the body of positive law on outer space. The first is the fact that the Charter codifies norms of conduct among States, and the

[2] ENMOD is the "Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques"; the Moon Agreement is the "Agreement Governing the Activity of States on the Moon and Other Celestial Bodies".

second the fact that international agreements on outer space usually refer to the Charter. In the former case, discussions in the CD cover the rationale in the Charter for the use of military force as stated in its Preamble. The Charter seeks to ensure, *inter alia*, that armed force shall not be used, save in the common interest of State Parties.[3] Moreover, as laid down in Article 1, paragraph 1, the purpose of the Charter is to maintain international peace and security via "...effective collective measures for the prevention and removal of threats to peace, and to bring about by peaceful means, ... in conformity with the principles of justice and international law...". Furthermore, Article 2, paragraph 3, stipulates that international disputes shall be settled by peaceful means in accordance with international peace, security, and justice, while paragraph 4 of the same Article states that:

> "[a]ll Members shall refrain in their international relations from the threat or use of force against the territorial integrity or political independence of any state, or in any other manner inconsistent with the Purposes of the United Nations."

The CD discussions are also guided by the *Declaration on Principles of International Law Concerning Friendly Relations and Co-operation Among States in Accordance with the Charter of the United Nations,* adopted on 24 October 1970.[4] This Declaration evokes the question of threat or use of force, as well as international conduct. It states, *inter alia*, that "State parties to an international dispute, as well as other parties, shall refrain from any action which may aggravate the situation so as to endanger the maintenance of international peace and security, and shall act in accordance with the purposes of and principles of the United Nations...". However, legal restraints on the use of force are also considered with respect to the Charter's right of self-defence provision (Article 51) which states that "[n]othing in the present Charter shall impair the inherent right of individual or collective self-defence if an armed attack occurs against a Member of the United Nations...".

Although none of these provisions deals specifically with arms limitation and disarmament, the *Ad Hoc* PAROS Committee has considered their implication for outer space. While there is no disagreement on the nature and principles of the Charter, there is contention in the search for a common interpretation of the content and interaction of its provisions.

Let us look, for example, at the scope of these provisions. Because the Charter does not specifically mention outer space, it has been asked whether it is in actual fact applicable in the prevention of an arms race in outer space. It has also been pointed out - by, for example, Morocco in 1989 - that, even if it is admitted that the Charter's provisions governing relations among States in respect of their activities on Earth should also govern their activities in space, there is some scepticism as to the Charter's applicability to outer space and also as to whether the principle of the non-use of force enumerated in the Charter would suffice to prevent an arms race in that environment.[5]

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[3] "Charter of the United Nations and Statute of the International Court of Justice," June 1945.

[4] CD/933, *Op. cit.*, p. 8 (GDR); "Declaration on Principles of International Law Concerning Friendly Relations and Cooperation Among States in Accordance with the Charter of the United Nations," *Official Records of the General Assembly*, A/RES/2625 (XXV), 24 October 1970.

[5] Much of this scepticism is based either on the inability of the Charter to curb an arms race on the ground, or on the need to develop a series of other legal instruments specifically designed to cover all types (including military) of activity in outer space. See also a discussion in CD/PV 508, *Op. cit.*, p. 16 (Morocco) and CD/954, *Op. cit.*, p. 10 (*Ad Hoc* PAROS Committee).

However, other delegations have countered with the argument that even if the Charter does not mention outer space, there is no indication either that the scope of its provisions is limited - in other words, since the Charter does not *verbis expressis* exclude outer space, outer space should therefore be considered as an environment in which the provision concerning the threat or use of force is legally binding.[6]

Another of the *Ad Hoc* Committee's concerns is the application of Article 2, paragraph 4, and Article 51 of the Charter.[7] One school of thought maintains that these two articles should be read together and that, in consequence, the threat or use of force in outer space is prohibited, except in self-defence.[8] It is also argued that objects in outer space are accorded a substantial degree of protection. However, another school of thought maintains that Article 51 does not legitimize the threat or use of force in outer space,[9] because any such legitimization would, by permitting weapons to be introduced into that environment, be contrary to the *Ad Hoc* Committee's specific objective of preventing any such development.

The Chilean delegation advanced an opinion (which did not, however, receive unanimous endorsement) that the prohibition of the use of force had the status of *jus cogens* under legal doctrine,[10] and therefore represented international practice in the use of outer space in that it "... is universally binding and has given rise to an entire body of customary law".[11] The question of whether the international public law of outer space is indifferent to other international security practices, particularly those which are corollary to the principles of the Charter, has also been raised on occasion. For example, although not concerned with customary law, a Canadian working paper presented a detailed review of certain concepts in United Nations resolutions which have formed the basis for space law conventions on the conduct of States in outer space.[12] Another issue discussed in the Canadian working paper was non-interference with certain satellites which has become, *ipso facto*, an integral part of every security agreement between the Soviet Union and the United States since the early 1970s. Furthermore, unilateral measures such as a moratorium on dedicated ASAT weapons were also examined within the framework of international custom.[13]

A further question is the relationship between the Charter and various agreements on international security, because the references to the Charter contained in the latter are frequently more than a mere reiteration of its general purposes and principles in their preambles.[14] However, this may also be because the Charter has precedence over other international agreements in the sense that it stipulates, in Article 103, that the

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[6] For a short but penetrating discussion on the applicability of the principle of the threat or use of force to outer space, see a study undertaken under the auspices of UNIDIR by V.S. Vereshchetin, *Prevention of the Arms Race in Outer Space: International Law Aspects*, UNIDIR, New York: United Nations Publications, 1986.

[7] CD/1034, *Op. cit.*, p. 9 (*Ad Hoc* PAROS Committee); CD/PV 516, *Op. cit.*, p. 18 (Sweden).

[8] See, for example, CD/954, *Op. cit.*, p. 9 (*Ad Hoc* PAROS Committee).

[9] *Ibid.*, p. 10.

[10] CD/915, *Op. cit.*, p. 1.

[11] *Ibid.*, p. 2.

[12] See CD/618, *Op. cit.*, pp. 26-31 (Canada). For a discussion on whether there is a customary law applicable to outer space and the prevention of an arms race in that environment, see a UNIDIR study entitled *Disarmament: Problems related to Outer Space, Op. cit.*, pp. 119-24.

[13] *Loc. cit.*

[14] In most cases, the Charter is invoked by a stipulation that the conduct of States should be in accordance with international law. Among the international agreements which are most relevant here are the Outer Space Treaty (Preamble and Article 3), the ENMOD Convention (Preamble and Article 5) and the Moon Agreement (Articles 2 and 4).

obligations in its provisions shall prevail in the event of conflict with obligations under any other international agreement.

Lastly, some delegations maintain that the Charter prohibits the threat or use of force in outer space and that the legal régime in this respect has been adequate, especially as no violations, as foreseen in Article 2, paragraph 4, have been reported in that environment. However, India has also argued that this does not mean that violation will not occur in the future.[15] To date, since neither the view based on the *de juris* status of positive law, nor the one founded on a *de facto* analysis of today's situation, has yet provided a satisfactory solution as to how the Charter should be interpreted, most delegations regard the CD's work in the further development of the legal body of space law as particularly opportune.

2. Outer Space Treaty, 1967

This Treaty is the most comprehensive of all the international agreements concerned with outer space.[16] It contains measures on both the *peaceful uses of outer space* and arms limitation in that environment, although it was in fact negotiated at the COPUOS which, as explained earlier, is primarily concerned with the peaceful exploration of outer space. Nevertheless, the Outer Space Treaty is of vital importance in governing civil and military activities in outer space, because its purpose is primarily to foster freedom of exploration, peaceful use and cooperation, and the establishment of the international responsibility of States in such activities, as may be seen from Article 1 which reads as follows:

> The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interests of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.
>
> Outer Space, including the moon and other celestial bodies, shall be free for the exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.
>
> There shall be freedom of scientific investigation in outer space, including the moon and other celestial bodies, and States shall facilitate and encourage international cooperation in such investigation.

The statement that the exploration and use of outer space shall be carried out for the benefit and in the interest of all countries has stimulated debate at the CD, where a number of delegations have argued on more than one occasion that any space activity which would affect the security of a subjacent State is unlawful.[17] Another subject of frequent comment is the stipulation in Article 3 that:

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[15] See CD/PV 529, *Op. cit.*, p. 8.

[16] "Treaty on Principle Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," *Op. cit.*. (See *infra*, Annex A.)

[17] "Statement submitted by Peru to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 544, 20 March 1990, p. 7; see also CD/915, *Op. cit.*, pp. 3-4 (Chile).

> States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.

However, it is Article 4 which is directly concerned with military activity in outer space. Unlike the PTB Treaty, which prohibits only a specific activity involving nuclear devices, Article 4 of the Outer Space Treaty prohibits the placement of nuclear weapons and any other mass destruction weapons which, it may be presumed, would include chemical and biological payloads. This widening of the prohibitions stemmed from various proposals and GA resolutions in the late 1950s and early 1960s which caused delegations to voice their concern that the deployment into orbit of any special device capable of delivering weapons of mass destruction should be prevented. Article 4 reads as follows:

> States Parties to this Treaty undertake not to place in orbit around the Earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.
>
> The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.

As already mentioned, Article 1 of the Outer Space Treaty speaks of exploration and use, and freedom of scientific investigation, in outer space including the moon and other celestial bodies. Article 4, on the other hand, addresses the military aspects of the Treaty and singles out outer space from the Earth orbit, the moon, other celestial bodies, and even the moon from other celestial bodies. Thus, these two Articles give rise to controversy. First, the placement of objects carrying nuclear weapons or any other kind of mass destruction weapons is prohibited in respect of the Earth orbit, as is the stationing of such weapons in outer space or their installation on celestial bodies. Although the moon is not specifically mentioned, it is generally understood that it is covered by the term "celestial bodies". It is also true, however, that no specific mention is made of space objects which would not orbit the Earth but only transit through outer space. A second controversial element is that the second paragraph of Article 4 does not specify outer space as a whole, only that the moon and other celestial bodies shall be used exclusively for peaceful purposes. The Chilean and Egyptian delegations have both taken a stand in this regard, the former noting that "[t]he prohibition set forth in this article [4] is clearly a partial one... Outer space and celestial bodies would therefore not have the same legal status, and certain military uses of outer space could not be legally excluded."[18] Thirdly, the paragraph subsequently selectively prohibits the establishment of military bases, installations and fortifications, the testing of any type of weapon and the conduct of military manoeuvres on celestial bodies, without referring to either outer

[18] CD/915, *Op. cit.*, p. 4 (Chile); for a discussion of this and several other questions, see CD/PV 550, pp. 14-15 (Egypt).

space or the moon. Here again, while the moon is generally considered to be a celestial body, the omission of the term "outer space" in the second paragraph of Article 4 has led to statements such as the one made by Egypt that there is "...an inherent contradiction in the same article of the Treaty, thereby creating, as a result, not one but two legal régimes: one applicable to outer space and the other confined to the Moon and other celestial bodies,"[19] a view which appears to be widely shared. The Canadian survey mentioned earlier also pointed out that:

> It is worthy of note that in the first three articles of the operative part of the Outer Space Treaty, in which the guiding principles governing space activities have been laid down, no mention of the use of the whole of outer space exclusively for peaceful purposes has been made... [i]t is only with respect to the moon and other celestial bodies that this concept has been accepted (Article IV (2)).[20]

The Canadian survey further called attention to the divergent interpretations of the scope of the prohibitions contained in this Article.[21] Some delegations argue that the Treaty's prohibitions are limited to the military activity mentioned in Article 4, while others maintain that the combination of Article 4 and other provisions in the Treaty so widen the scope of prohibitions that the purpose is, in effect, a complete demilitarization of outer space. However, this latter argument does not find much support among those delegations which uphold the right of legitimate self-defence in outer space. It is thought, however, that a complete demilitarization of outer space would be legally more sustainable if States Parties to the Treaty adhered to an additional agreement interpreting the provisions in the Treaty, as stipulated in paragraphs 3 and 4 of Article 31 of the Vienna Convention.[22] As for the argument that military activities are limited, the Canadian survey states that this has a sound legal foundation on the grounds of (a) the Treaty's negotiating history, (b) the terms of the text itself, and (c) the general practice of States in this context,[23] and in fact this view is compatible with the application of paragraphs 1 and 2 of Article 31 of the Vienna Convention, as well as international custom.

Various delegations have also singled out the need to create additional protocols to the Outer Space Treaty to establish theoretical consistency among several of its provisions, thereby strengthening the legal basis of the Treaty as a whole. In the view of the Peruvian delegation, to mention only one example, Article 4 contains a legal loophole which permits the deployment of a new generation of weapons such as KEWs and DEWs in outer space.[24] Peru has therefore argued that the prevention of an arms race in outer space could also be achieved by expanding the prohibitions in Article 4 to cover the placement in orbit around the Earth of any objects carrying any type of

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[19] CD/PV 550, *Op. cit.*, p. 15.

[20] For further observations, see CD/618, *Op. cit.*, p. 10 (Canada), and references cited therein, and an article by Du Shuhua "The Outer Space and the Moon Treaties," in *Verification of Current Disarmament and Arms Limitation Agreements: Ways, Means and Practices*, UNIDIR, New York: United Nations Publication, 1991 (forthcoming).

[21] See CD/618, *Op. cit.*, p. 11, and references cited in the discussion for more details of the different interpretations.

[22] "Vienna Convention on the Law of Treaties," *United Nations Treaty Series*, 1155, 1969, p. 331.

[23] CD/618, *Op. cit.*, p. 11.

[24] See "Statement submitted by Zaire to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 461, 28 April 1988, pp. 9-10; CD/PV 472, *Op. cit.*, 6-7 (Peru); CD/PV 544, *Op. cit.*, pp. 6-8 (Peru); and a discussion in CD/618, *Op. cit.*, p. 12 (Canada).

weapons,[25] and, by extension, to the installation of such weapons on celestial bodies or stationing such weapons in outer space in any other manner. This was also the view of Kenya which favoured a ban on the development of any space-related weapons to prevent an arms race in outer space before it began.[26] With these differences of appreciation as to what current military activities in outer space actually constitute, China (for whom, in a sense, an arms race in outer space has already begun) has also supported the call for a reconsideration of international instruments relevant to outer space in order to "plug any loopholes".[27] Further attempts to strengthen prohibitions in the Outer Space Treaty include a controversial 1982 proposal by the Soviet Union,[28] which submitted a draft treaty containing a number of provisions to make good the Treaty's shortcomings in respect of the placement of conventional weapons in the Earth's orbit.

Yet another aspect of the Outer Space Treaty is the establishment of norms concerning responsibility, liability, and jurisdiction relative to space activities, as well as the registry of objects launched into outer space, including the moon and other celestial bodies (Articles 6, 7, and 8). It appears to be a matter of general agreement between delegations that unanimity on the scope of positive law on all these issues must be reached before any real negotiations can get under way at the *Ad Hoc* PAROS Committee. At the moment, the main question seems to turn on whether the existing provisions suffice, or whether the *Ad Hoc* Committee will have to take into consideration norms concerning responsibility, liability, and jurisdiction in the future.

Article 9 of the Treaty lays down the principle of mutual assistance and co-operation in the exploration of outer space, including the moon and other celestial bodies. However, the fact that it could also have implications for security has attracted the attention of certain delegations.[29] The Article stipulates that State Parties to the Treaty shall, in pursuing studies and the exploration of outer space including the moon and other celestial bodies, avoid "...harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraordinary matter...". Also considered by the *Ad Hoc* Committee has been the case of an activity or experiment being planned by a State Party or its nationals which is thought to be of potential harm to third parties, in which case the former shall undertake appropriate international consultations before proceeding with any such activity or experiment. However, one of the most interesting provisions in Article 9 is the reference to potential harmful interference as a result of activity or experiment on the part of another State:

> ... A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the moon and other celestial bodies, may request consultations concerning the activity or experiment.

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[25] CD/PV 544, *Op. cit.*, p. 8.

[26] "Statement submitted by Kenya to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 499, 30 March 1989, p. 11.

[27] "Statement submitted by China to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 525, 10 August 1989, pp. 22-27; "Statement submitted by The Netherlands to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 499, 30 March 1989, p. 11.

[28] CD/274, *Op. cit.*

[29] See, for example, a legal survey by the German Democratic Republic, Bulgaria, and Hungary in CD/933, *Op. cit.*, p. 15.

Since the term *harmful interference* is not clearly defined, it may be asked whether the words "harmful interference with activities in the peaceful exploration and use of outer space" also cover military activities in outer space.

This leads to the question of the relevance of the verification procedures in Articles 10 and 12 to the work of the *Ad Hoc* PAROS Committee. Limited but significant verification procedures in Article 10 stipulate that State Parties shall consider, on a basis of equality, any requests for permission to observe the flight of space objects they launch into space. The provisions of Article 12, however, are more complex in that while they speak only of the moon and other celestial bodies (i.e., outer space is excluded), they are more far-reaching about the procedure to be followed:

> All stations, installations, equipment and space vehicles on the moon and other celestial bodies shall be open to representatives of other States Parties to the Treaty on the basis of reciprocity. Such representatives shall give reasonable advance notice of a projected visit, in order that appropriate consultations may be held and that maximum precautions may be taken to assure safety and to avoid interference with normal operations in the facility to be visited.

It must be emphasized that Articles 10 and 12 do not impose *ipso facto* acceptance of a request to observe the flight of space objects or to make a visit. Furthermore, the verification measures do not appear to cover all possible military uses of outer space, nor do they appear to cover all the potential components of the space environment. For example, the moon and other celestial bodies are mentioned, but there is no reference to stations, installations, equipment and space vehicles orbiting in outer space itself. Thus, the Treaty fails to provide any mandatory mechanism or procedure to verify compliance with the provisions on security matters in Article 4 either on the ground during the launching of a space object or subsequently when it is already in outer space.

3. The Anti-Ballistic Missile Treaty and Other Bilateral Agreements

The Anti-Ballistic Missile Treaty (1972)[30] is a significant arms limitation agreement in that it endeavours to curb the arms race between the Soviet Union and the United States in the area of defence systems against ballistic missiles. It is also significant in international space law because it helps to avert an arms race of this specific type of weaponry in outer space and the Earth environment. Thus, the Treaty is particularly relevant to the work of the *Ad Hoc* PAROS Committee, especially since some of its stipulations have been further developed in other arms limitation agreements (e.g., the obligation regarding the non-interference with each Party's National Technical Means (NTMs) of verification) and included in a number of new proposals presented at the CD (e.g., the extension of the Treaty's measures to cover multilateral activity related to outer space).

The objective of the ABM Treaty is to limit defence systems designed to counter strategic ballistic missiles or their elements in flight trajectory. This includes ABM

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[30] "Treaty Between the USA and the USSR on the Limitation of Anti-Ballistic Missile Systems," *Treaties and Other International Acts, Series*, No. 7503, US Department of State Washington, D.C., 1973. (See *infra*, Annex C.)

launchers, interceptors, and radars constructed and deployed for an ABM role or tested in an ABM mode. The Treaty applies to ABM systems which were operational at the time, under construction, undergoing testing/repair/conversion, or mothballed.

Article 1 sets forth the basic principle of arms limitation by stipulating that each Party shall undertake to confine the deployment of ABM systems to agreed limits and regions. The limitation covers the development, testing, and deployment of ABM systems and/or their components which are sea-based, mobile land-based, air-based, and, most important in the context of this review, *space-based* (Article 5). Details of permissible deployments are given in Article 3, whereby each Party undertakes not to deploy ABM systems or their components, except for a specified number of ABM radars and no more than 100 ABM interceptor missiles at each of two specific launch sites - namely, (a) within one ABM system deployment area having a radius of 150 km and centred on the Party's national capital, and (b) within one ABM system deployment area also having a radius of 150 km and containing ICBM silo launch sites. However, other provisions include obligations to avoid circumvention of the Treaty's objective via the development of other ABM-capable missiles. For example, in Article 6, each Party undertakes:

> (a) not to give missiles, launchers, or radars, other than ABM interceptor missiles, ABM launchers, or ABM radars, capabilities to counter strategic ballistic missiles or their elements in flight trajectory and not to test them in an ABM mode; and
>
> (b) not to deploy in the future radars for early warning of strategic ballistic missile attack except at locations along the periphery of its national territory and oriented outward.

Article 9 widens this obligation, by calling for a commitment by each Party not to transfer the ABM systems or components covered by the Treaty to other States or to deploy them outside its national territory. In 1974, the two Parties agreed to cutback the number of permissible deployment ABM systems and their components and the corresponding sites to one.[31]

The disarmament requirements are contained in Article 8 which calls for the destruction or dismantling of ABM systems and their components which are (a) in excess of the numbers or outside the areas specified and agreed in the Treaty and (b) prohibited by the Treaty itself. As has been mentioned in the section on SD, following the dismantling of its ABM system (code-named SAFEGUARD) in 1975, the United States does not now have an operational ABM system, although it is believed that the system would be functional if redeployed. In contrast, the Soviet Union still operates one such system near Moscow and is reportedly upgrading its interceptors and radars as permitted in Article 7.

However, the legal interpretation of the ABM Treaty has become a controversial issue.[32] The advocates of one interpretation, referred to as the *traditional, restrictive* or

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[31] "Protocol to the Treaty Between the USA and the USSR on the Limitation of Anti-Ballistic Missile Systems," *United Nations General Assembly*, A/9698, Annex III, 9 August 1974. (See *infra*, Annex D.)

[32] Discussions in the United States regarding the interpretation of the ABM Treaty centre on two legal régimes with different approaches as to focus and procedure. One, based on internal US law, is concerned with the analysis of a reinterpretation of the Treaty, whereby US federal law takes into account factors such as the meaning intended by the Parties and the history of the negotiations leading to the Treaty, which include unilateral statements of understanding. The other interpretation is based on the international legal régime of Articles 31 and 32 of the Vienna Convention which, first and foremost, considers "...the ordinary meaning to be given to the terms of the treaty in their context and in the light of its object and purpose". (See the Vienna Convention, *Op. cit.*) This difference in approach has been emphasized in statements made in the US Senate recalling that, in contrast to US federal

(continued...)

narrow interpretation, argue that the Treaty limits development, testing and deployment of ABM systems and components in sea-based, air-based, mobile land-based, and space-based systems, regardless of the technology applied.[33] In contrast, supporters of the so-called *broad interpretation* or *reinterpretation*[34] argue that, over and above the research issue, the re-examination of the traditional interpretation of the Treaty has led to a assumption that testing of ABM systems and/or their components is permitted if they have been developed after 1972 and are based upon physical principles other than those stipulated in the Treaty.[35] This lobby maintains that such systems can be deployed if an agreement is reached between the contracting Parties, as provided for in item 1, [D] of the Agreed Interpretations document, which is an integral part of the ABM Treaty. This reads as follows:

> In order to ensure fulfilment of the obligation not to deploy ABM systems and their components except as provided in Article III of the Treaty, the Parties agree that *in the event that ABM systems based on other physical principles and including components capable of substituting for ABM interceptor missiles, ABM launchers, or ABM radars are created in the future, specific limitations on such systems and their components would be subject to discussion in accordance with Article XIII and agreement in accordance with Article XIV of the Treaty.*[36]

Hence, reinterpretation is largely based on the argument that weapons deriving from new technology, such as directed energy (e.g., the electromagnetic rail gun), fall within the term *physical principles* in item 1, [D] of the Agreed Interpretations. In 1987, the United States explained its position to the CD in the following terms:

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[32](...continued)
law which places priority in the preparatory work of the Treaty, the negotiating record of the Treaty is considered only as a supplementary means of interpretation in the Vienna Convention (Article 32). Nevertheless, the US interpretation of the ABM Treaty generally favours national law, largely because the United States has signed but not ratified the Vienna Convention. The Convention is not, therefore, statutory law in the United States. For a comprehensive discussion of this question and further references, see David J. Scheffer, "Legal Analysis of the Interpretation and the Termination of Treaties with Particular Reference to the ABM Treaty", in "Review of the ABM Treaty Interpretation Dispute and SDI", Hearing before the Subcommittee on Arms Control, International Security and Science of the *Committee on Foreign Affairs, House of Representatives*, 100th Congress, First Session, Washington D.C: U.S. Printing Office, February 26, 1987, pp. 84-97; see also statements made by William R. Harris, pp. 70, 93; "The ABM Treaty and the Constitution," *Senate Foreign Relations Committee and Senate Judiciary Committee*, Washington D.C: U.S. Printing Office, 1987.

[33] See discussions in "ABM Treaty Interpretation Dispute," Hearing before the Subcommittee on Arms Control, International Security and Science of the *Committee on Foreign Affairs, House of Representatives*, 99th Congress, First Session, Washington D.C: U.S. Printing Office, February 26, 1985; Chayes and Chayes, "Testing and Development of 'Exotic' Systems Under the ABM Treaty: The Great Reinterpretations Caper," *Harvard Law Review*, No. 1956, 1986.

[34] On 5 October 1985, the Reagan Administration advanced the possibility that, after 13 years of interpreting the Treaty in its *traditional* sense, a broader interpretation might be conceivable (see *inter alia* "Strategic Defense Initiative," *Senate Armed Services Committee*, Washington D.C: U.S. Printing Office, November 21, 1985; "ABM Treaty Interpretation Dispute," *House Foreign Affairs Committee*, Washington D.C: U.S. Printing Office, October 22, 1985; Abraham D. Sofaer, *The ABM Treaty Part I: Treaty Language and Negotiating History*, 11 May 1987, *The ABM Treaty Part II: Ratification Process*, 12 March 1987; and *The ABM Treaty Part III: Subsequent Practice*, 9 September 1987; and a statement by John B. Rhinelander, former Legal Advisor to the ABM Treaty Negotiations, in "Review of the ABM Treaty Interpretation Dispute and SDI," Hearing before the Subcommittee on Arms Control, International Security and Science of the *Committee on Foreign Affairs, House of Representatives, Op. cit.*; *Report of the Defense Science Board Task Force Subgroup on Strategic Air Defense: SDI Milestone Panel), Op. cit.*, pp. 6-8. See also "The Reinterpretation of the ABM Treaty," by Bunn in *The ABM Treaty and National Security, Op. cit.*, pp. 58-73.

[35] See a memorandum by David J. Scheffer, "Legal Analysis of the Interpretation and the Termination of Treaties with Particular Reference to the ABM Treaty," *Committee on Foreign Affairs, House of Representatives*, 100th Congress, First Session, *Op. cit.*, Appendix 2, p. 86, and references quoted in footnote 2; *Report to the Congress on the Strategic Defense Initiative: 1986*, Washington, D.C.: Strategic Defense Initiative Organization, June 1986.

[36] "Agreed Interpretations and Unilateral Statements Regarding the ABM Treaty," *Treaties and Other International Acts Series* No. 7503, US Department of State Washington, D.C., 1973. (See *infra*, Annex C.) Emphasis added.

> In the United States view, its interpretation of the [ABM] Treaty -- that the parties did not agree to ban the development and testing of systems based on other physical principles -- is fully justified. Nevertheless, as President Reagan has directed, the United States is following an even more restrictive course than required by the Treaty.[37]

It may be noted that the United States and the Soviet Union have decided to undertake discussions on ABM and space, "...including the relationship between strategic offensive and defensive arms, taking into account stabilizing reductions in strategic offensive arms and development of new technologies."[38] In the absence of agreement on a common interpretation of the Treaty, or a withdrawal from it (this right having been provided for in Article 15, paragraph 2),[39] BMD is not entirely prohibited by the Treaty. For instance, the research, development and testing of fixed land-based ABM systems at selected test sites are permitted. Field testing of prototypes of space-based BMD systems or their components is prohibited, but laboratory research is not.[40] Additionally, development, testing and deployment of space-based laser devices, testing of sub-components for space-based BMD lasers (such as point and tracking devices which are not capable of countering strategic ballistic missiles or their elements in flight trajectory and which are not tested in ABM mode) are also said to be permitted.[41] While the Soviet Union has acknowledged the full right of both Parties to conduct the research, development, and testing permitted by the Treaty, it has also stated its intention to observe the ABM Treaty as signed in 1972. The Soviets foresee an agreement on non-withdrawal from the Treaty for a specified period of time. In addition, they maintain that "...the agreement to be worked out in the current negotiations should not include a provision authorizing the deployment of large-scale ABM systems, including space-based systems, immediately after the period of non-withdrawal".[42]

Many of the delegations to the CD have expressed their concern by calling on the Soviet Union and the United States to observe the provisions of the Treaty. It has also been suggested at the *Ad hoc* Committee that anti-ballistic technology should be limited. For example, France is in favour of negotiations to reach agreement on verifiable limits of new and future anti-ballistic technology before any irreversible development occurs.[43] Other proposals endorsing such negotiations have also mentioned the possibility of widening the scope of the legal régime established by the ABM Treaty. For example, Sweden has proposed that the Treaty's ban on the development, testing and deployment of space-based ABM systems should become a multilateral agreement, which would also make provision for certain new technological changes.[44] Nevertheless, proposals submitted in the *Ad Hoc* Committee to limit ABM technology also include prohibitions

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[37] CD/PV 349, *Op. cit.*, p .13.

[38] "Joint Statement on Future Negotiations on Nuclear and Space Arms and Further Enhancing Strategic Stability," *Official Text*, Washington, D.C.: United States Arms Control and Disarmament Agency, June 1, 1990, p. 1; also see CD/1087, *Op. cit.*, p. 6 (USA).

[39] It should be noted here that statments made by the United States delegation in the *Ad Hoc* PAROS Committee have favoured the implementation of cooperative transition rather than withdrawl from the Treaty - see, for example, CD/1087, *Op. cit.*, p. 5 (USA).

[40] This view has been expressed by some Western delegations in working papers submitted to the *Ad Hoc* PAROS Committee.

[41] *Ibid.* In addition, the United States has stated in plenary meetings of the CD that the ABM Treaty "... allows not only research, but also development, testing and even deployment, subject to limitations", see CD/PV 349, *Op. cit.*, p. 13.

[42] CD/PV 523, *Op. cit.*, p. 8.

[43] CD/PV 263, *Op. cit.*, p. 21.

[44] See "Statement submitted by Sweden to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 516, 11 July 1989, p. 18; and a paper by Pakistan, "Proposal Relating to the Prevention of an Arms Race in Outer Space, International Instrument to Supplement the ABM Treaty", submitted by Pakistan to the *Conference on Disarmament*, CD/708, 26 June 1986.

on space-based ASAT weapons. The problem most often mentioned is that, although the testing and placing of nuclear weapons and other kinds of nuclear explosive in outer space are prohibited, there is no similar prohibition for weapons as ASAT or anti-missile weapons which are based on conventionally armed munitions, or potential ground or space-based weapons based on exotic technology - e.g. DEWs.[45]

Apart from weapon limitation, the ABM Treaty is also relevant to the PAROS because of the norms it has established on the use of NTMs for verification purposes. This is the first agreement to refer to verification by these means, as may be seen from Article 12, paragraph 1, which codifies individual means of verification and specifies that they shall be carried out in a manner consistent with generally recognized principles of international law. Here, the concept of non-interference with NTMs (Article 12, paragraph 2) is also important since NTMs include ground and space-based objects. This concept also implicitly includes the protection of such space-based systems as reconnaissance satellites (Article 12, paragraph 3) - and protection against ASAT weapons. *Legitimacy* is therefore given to satellite activities for monitoring arms limitation and disarmament agreements. This type of surveillance comes within the framework of the generally accepted principles of international law, and the possibility of its inclusion in a future multilateral agreement on outer space has been discussed at the *Ad Hoc* Committee.[46]

Non-interference with NTMs has also been written into other USSR/USA agreements. Like the provisions of Article 12 of the ABM Treaty, the verification measures in the 1972 Strategic Arms Limitation Talks (SALT I) Agreement and the 1979 Strategic Arms Limitation Treaty (SALT II)[47] are of particular importance to outer space (although, of course, SALT II has never entered in force). In SALT I, paragraphs 1 and 2 of Article 5 stipulate that each Party shall use the verification NTMs at its disposal and not "... interfere with the National Technical Means of Verification of the other Party operating in accordance with paragraph one of this Article [that is, for the purpose of providing assurance of compliance with the provisions of the Interim Agreement via the use of NTMs]." Similar provisions are also given in paragraphs 1, 2 and 3 of Article 15 of SALT II.[48]

Another important provision is Article 9 (paragraph 1 (c)) of SALT II, which prohibits the development, testing or deployment of systems for placing into Earth orbits nuclear weapons or any other kind of weapons of mass destruction, including fractional orbital missiles. While the first part of the prohibition is basically an endorsement of Article 4 of the Outer Space Treaty, the inclusion of a technologically specific weapon system - Fractional Orbital Bombardment Systems (FOBS) - is generally considered as a step further in the prohibition of space capable weapons.[49] Indeed, it has been asked

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[45] Assuming that DEWs are not (a) considered to fall within the definition of weapons of mass destruction, (b) capable of countering strategic ballistic missiles, or (c) tested in an ABM mode. For brief discussions and references on this issue, see CD/618, *Op. cit.*, p. 12 (Canada); CD/915, *Op. cit.*, p. 4 (Chile).

[46] See CD/618, *Op. cit.*, p. 18 (Canada).

[47] "Interim Agreement Between the USA and the USSR on Certain Measures with Respect to the Limitation of Strategic Offensive Arms," *Treaties and Other International Acts Series*, No. 7504, Washington, D.C.: US Department of State, 1972; "Treaty Between the USA and the USSR on the Limitation of Strategic Offensive Arms," *Government Document No. Y1.96/1:Y* 96th Congress, First Session, 37, 1979.

[48] The SALT II agreement was not ratified, but both parties have said that they would observe it for a given period of time.

[49] The Soviet Union has reportedly agreed to dismantle its FOBS although under no obligation to do so, SALT II having neither stipulated such disarmament nor entered into force as regards the development, testing, and deployment of existing FOBS.

at the *Ad Hoc* PAROS Committee how weapons which do not require a full orbit around the earth and could therefore be considered as not actually being placed in orbit, thus escaping the provisions of the Outer Space Treaty, could be prohibited. Here, some delegations, including Sweden, have favoured a multilateral prohibition of FOBS modelled on the USSR/USA bilateral agreement.[50]

A number of other bilateral instruments which, although not stipulating arms limitation or disarmament measures, have some relevance to the *Ad Hoc* Committee's work and should be mentioned here. One is the 1971 bilateral USSR/US agreement to reduce the risk or outbreak of nuclear war.[51] Under this agreement each Party undertakes to notify the other in the event of an accidental or unauthorized incident which might cause a nuclear war. In Article 4, the notification requirement includes advance notice of planned launches in the case that any such launches extend beyond the national territory of the launching Party and in the direction of the other Party.

However, it is Article 3 which is more directly relevant to present and future space law, since it more or less legitimizes the existence and use of certain satellite systems for military purposes, while establishing some protection for ground and space-based platforms which are an integral part of both USSR and US ballistic missile detection systems. For quick reference, the Article reads as follows:

> The Parties undertake to notify each other immediately in the event of detection by missile warning system of unidentified objects, or in the event of signs of interference with these systems or with related communications facilities, if such occurrences could create a risk of outbreak of nuclear war between the two countries.

Given the state of technology at the time, the inclusion of "warning systems" must have implicitly referred to the military satellite component of BM detection, since the reference to interference with this type of warning system indirectly protects a system which is seen as having a vital stabilizing function in relations between the Soviet Union and the United States.

These two aspects of the 1971 agreement were further codified in another bilateral instrument signed on the same day - namely, the Agreement on Measures to Improve the Direct Communication Link.[52] This agreement confirms the peaceful role of outer space by establishing two communications circuits between the United States and the Soviet Union, one via the US INTELSAT system and the other via the Soviet MOLNIYA II system, as well as at least four ground stations equally distributed within their respective territories. Further, guarantees of some degree of protection against interference with the ground and space-based segments of these systems were granted in Article 2; these call on both States to confirm their "...intention to take all possible measures to assure the continuous and reliable operation of communication circuits and the system of terminals of the Direct Communications Link...".

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[50] See CD/PV 516, *Op. cit.*, pp. 18-20 (Sweden).

[51] See CD/618, *Op. cit.* (Canada); CD/933, *Op. cit.* (GDR); and "Agreement on Measures to Reduce the Risk of Outbreak of Nuclear War," *United Nations Treaty Series*, vol. 807, New York, 30 September 1971, p. 57.

[52] See CD/618, *Op. cit.* (Canada); CD/933, *Op. cit.* (GDR); "Agreement on Measures to Improve the Direct Communication Link," *Treaties and Other International Acts Series*, 7187, Washington D.C.: US Department of State, 1971. The original communications link, a Memorandum of Understanding Regarding the Establishment of a Direct Communications Link, was signed in 1963.

With the view to supplementing earlier measures of communication at the government-to-government level, the 1987 USSR/US Nuclear Risk Reduction Centres Agreement further codified the use of satellite communication in the interest of mutual security.[53] Communication between the two countries is based on direct satellite links whereby the exchange of information and notifications required under certain arms limitation, disarmament, and confidence-building agreements can be made. Protocol I, Article 1, calls for notification of ballistic missile launches under Article 4 of the 1971 Nuclear Accidents Agreement and under paragraph 1 of Article 6 of the 1972 Prevention of Incidents on and over High Seas Agreement. To achieve this, Protocol II, Article 1, stipulates the establishment and maintenance of an INTELSAT satellite circuit and a STATIONAR satellite circuit to provide facsimile communication between each Party's national Nuclear Risk Centres.

Two other bilateral agreements with some bearing on the work of the *Ad Hoc* Committee are the 1988 Notifications of Launches Agreement, and the 1989 Prevention of Dangerous Military Activities Agreement.[54] Article 1 of the 1988 Agreement stipulates that each Party shall provide notification, no less than 24 hours in advance, of the planned date, launch area, and area of impact for any launch of a strategic ballistic missile (ICBM or SLMB) and the geographical coordinates of the planned impact area or areas of the re-entry vehicles. In the 1989 Agreement, words and terms such as *lasers* and *interference with command and control networks* are defined.[55] This Agreement also codifies the use of lasers in peacetime, Article 2 stipulating, for example, that each Party shall take the necessary measures directed towards preventing the use of "...a laser in such a manner that its radiation could cause harm to personnel or damage to equipment of the armed forces of the other Party".

The importance of all the above-mentioned bilateral agreements to the work of the *Ad Hoc* Committee on PAROS has been often emphasized,[56] but some concern has also been expressed that, in respect of ASAT activities, the present legal régime falls short in that it fails not only to make explicit reference to ASAT weapons but also to incorporate the whole spectrum of space-based objects. A frequent observation at the CD is that bilateral agreements establish a limited régime which seeks to protect satellites identified to perform a specific function and a limited and particular goal between the Soviet Union and the United States. Existing protection of space platforms

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[53] "Agreement Between the United States of America and the Soviet Socialist Republics on the Establishment of Nuclear Risk Reduction Centres," *Arms Control and Disarmament Agreements*, Washington, D.C: United States Arms Control and Disarmament Agency, 1990, pp. 338-44. (Also see Protocols I and II to the Agreement.)

[54] "Agreement Between the United States of America and the Soviet Socialist Republics on Notifications of Launches of Intercontinental Ballistic Missiles and Sub-marine-launched Ballistic Missiles," *Arms Control and Disarmament Agreements, Op. cit.*, pp. 447-49; "Agreement Between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on the Prevention of Dangerous Military Activities", *International Law Material*, 1989, pp. 879-895.

[55] For the purpose of the 1989 Prevention of Dangerous Military Activities Agreement, a *laser* "...means any source of intense, coherent, highly directional electromagnetic radiation in the visible, infrared, or ultraviolet regions that is based on the stimulated radiation of electrons, atoms or molecules". *Interference* is defined as "...actions that hamper, interrupt or limit the operation of the signals and information transmission means and systems providing for the control of personnel and equipment of the armed forces of a Party".

[56] See, for instance, CD/PV 516, *Op. cit.*, p. 18 (Sweden).

is therefore limited to three types of satellite: early warning systems, reconnaissance satellites, and communication satellites.[57]

Nevertheless, positive observations have also been made, particularly regarding the *de facto* protection of both satellites and their corresponding ground segments. Further, it has also been acknowledged that these bilateral agreements are important because of the precedents they have set in codifying the norm of *non-interference* with Earth-orbiting objects. This is thought to have opened up the possibility of codifying other case-specific satellites and the widening of the scope of protection beyond the bilateral level.

4. Partial Test-Ban Treaty, 1963

Chronologically speaking, the Partial Test-Ban (PTB) Treaty of 1963 is the first international law on arms limitation in outer space,[58] the provisions concerned all being grouped in Article 1. The Treaty is also an activity-specific instrument in that it does not prohibit the placing or use of weapons in outer space, but only the testing of a specific type of payload material in selected physical environments as stated in Article 1:

> 1. Each of the Parties to this Treaty undertakes to prohibit, to prevent, and not to carry out any nuclear weapons test explosion, or any other nuclear explosion, at any place under its jurisdiction or control:
>
> (a) in the atmosphere; beyond its limits, *including outer space*; or under water, including territorial waters of high seas; or
>
> (b) in any other environment if such explosion causes radioactive debris to be present outside the territorial limits of the State under whose jurisdiction or control such explosion is conducted...
>
> 2. Each of the Parties to this Treaty undertakes furthermore to refrain from causing, encouraging, or in any way participating in, the carrying out of any nuclear test explosion, or any other nuclear explosion, anywhere which would take place in any of the environments described, or have the effect referred to, in paragraph 1 of this Article.[59]

It will be noted that although subparagraph (a) prohibits testing in outer space, the possibility of testing in an underground environment is not mentioned. On the other hand, subparagraph (b) does prohibit underground testing if any such explosion causes radioactive debris to be present outside the territorial limits of the State conducting the tests. Thus, the logical corollary is that any nuclear test whose radioactive debris may

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[57] Bilateral agreements, such as the 1974 TTBT [Threshold Test Ban Treaty] and the 1976 PNET [Peaceful Nuclear Explosions Treaty] have also incorporated the possibility of using NTMs to conduct verification (TTBT, Article 2, and PNET, Article 4, refer). See also a discussion in CD/618, *Op. cit.*, p. 20 (Canada). Bilateral treaties such as the 1987 INF Treaty and the future START Agreement have also endorsed non-interference with the use of NTMs and further developed verification provisions for *in loco* inspections on military-related sites. On verification by NTMs for START, see for example, "Verifying START: From Satellites to Suspect Sites", by Dunbar Lockwood in *Arms Control Today*, vol. 20, No. 8, October 1990, pp. 13-19.

[58] "Treaty Banning Nuclear Weapons Test in the Atmosphere, in Outer Space and Under Water", *United Nations Treaty Series*, vol 480, No. 6964. For a more detailed discussion of this treaty, see "The Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water (10 October 1963) and Peaceful Uses of Outer Space", by Nicolas Mateesco Matte, in *Annals of Air and Space Law*, vol. IX, 1984, pp. 391-414. Also see Conférence d'amendement des Etas parties au Traité interdisant les essais d'armes nucléaires dans l'atmosphère, dans l'espace extra-atmosphérique et sous l'eau, *Raport*, New York, 7-18 janvier 1991, New York: PTBT/CONF/13/Rev. 1, 1991.

[59] Emphasis added.

reach outer space is forbidden and, therefore, that any such test conducted on the moon or other celestial bodies and having this effect is presumably also prohibited. However, the Outer Space Treaty of 1967 and the Moon Agreement of 1979 subsequently excluded such a possibility.

The scope of the PTB Treaty is widened in paragraph 2 of Article 1 which prohibits any activity of State Parties which could induce or actually contribute to the testing of nuclear devices by third Parties in any of the environments enumerated in subparagraph (a), one of which is outer space. There is, however, no reference to underground testing.

The prohibition of nuclear explosion tests in outer space serves at least two important purposes: it helps to avert a nuclear arms race in outer space, and it removes the threat to the normal functioning of civilian and military satellites which are sensitive to electromagnetic pulse effects of nuclear explosion in outer space.[60]

Another aspect of the Treaty which has attracted the interest of delegations to the CD is the absence of any procedure to verify compliance with the obligations of Article 1. Furthermore, since some members of the United Nations Security Council who are known nuclear power States are not yet Parties to the Treaty (even though they have stopped testing in the environments concerned), the legal status of the Treaty is generally regarded as weak.

5. Environmental Modification Convention, 1977

Devised by the Conference on the Committee on Disarmament (CCD) in the 1970s on the basis of a desire "... to contribute to the cause of halting the arms race", the Environmental Modification (ENMOD) Convention[61] plays an important role in the establishment of norms to curb the use of new means of warfare. Its conception was greatly motivated by the recognition that military or any other hostile use of new techniques could modify the environment and in paragraph 1 of the first Article of the Convention States Parties have agreed:

> ...not to engage in military or any other hostile use of environmental modification techniques having widespread, long-lasting or severe effects as the means of destruction, damage or injury to any other State Party.

It follows from this text that "military or any other hostile use" of the environment is understood to include three important parameters: the area, the duration, and the

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[60] See Mateesco Matte, *Op. cit.*, p. 404, and the several references cited therein to technical articles describing electromagnetic pulse effects in outer space.

[61] "Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques", *Official Records of the General Assembly*, A/RES/3172, 1977, Annex. For a discussion on the negotiating history and earlier drafts of this instrument, see "Draft Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques," submitted by the Union of Soviet Socialist Republics to the *Conference of the Committee on Disarmament*, CCD/471, 21 August 1975; "Draft Convention on the Prohibition of Military or Any Other Hostile Use of Environmental Modification Techniques," submitted by the United States to the *Conference of the Committee on Disarmament*, CCD/472, 21 August 1975; "The ENMOD Convention Review Conference," by Josef Goldblat, *Disarmament*, Vol. VII, No. 2, Summer 1984, pp. 93-102.

intensity of the phenomenon modifying the environment.[62] Further provisions in the same Article cover a secondary role in that States Parties undertake not to assist, encourage or induce any State, group of States, or even international organizations to engage in similar activities.

However, it is the second Article of the Convention which goes even further by defining both the term *environmental modification techniques* and the boundaries within which the Convention is applicable, including the outer space environment:

> As used in Article I, the term "environmental modification techniques" refers to any technique for changing - through the deliberate manipulation of natural processes - the dynamics, composition or structure of the earth, including its biota, lithosphere, or of outer space.

As may be seen in the *understanding to Article II* of the Convention, the meetings of the Conference on the Committee on Disarmament held before the ENMOD Convention was signed considered some of the possible modifications to the environment through the use of special techniques, including changes in the ozone layer or in the state of the ionosphere. It was against this background that it was hoped that the Convention would "... to a certain extent protect satellites against interference resulting from disturbance of the environment through which they travel".[63]

Nevertheless, in the mid-1980s the United Kingdom claimed that while "space" had been inserted to make the area of prohibition as extensive as possible, the prohibited techniques in the ENMOD Convention were largely theoretical. However, this view is not now widely shared in the CD.

It is clear from the ENMOD Convention that some origins of possible environmental modification are not prohibited.[64] For example, the use of what are called non-hostile techniques is not forbidden, nor are the effects which do fall outside the boundaries of one or more of the three parameters mentioned above. Furthermore, the Convention does not prohibit the research, development (including testing) and deployment of military technical devices which could result in such modification.

The fact that verification is not provided for has also been brought to the CD's attention as in, for example, the Canadian survey mentioned earlier,[65] which makes note of views maintaining that military and weather satellites would be appropriate means of verifying States' obligations.[66] Moreover, Article 5 provides for consultation and co-operation between States Parties to the Convention, or through the machinery of the United Nations. In particular, consultation through appropriate international procedures

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[62] While none of these parameters has been specifically defined in the Convention, one way of interpreting them has been to consider the *understandings relating to Article I* put forward by the Conference of the Committee on Disarmament in 1976, which accompany the Convention as part of the negotiating record. According to these understandings, the term *widespread* has been defined as encompassing an area of several hundred square kilometres. *Long-lasting* is to be interpreted as covering a period of months or approximately a season. The intensity of the term *severe* has been described as involving serious or significant disruption or harm to human life, including natural and economic resources as well as other assets. See CD/618, *Op. cit.*, p. 22 (Canada), and references therein; "Understandings Relating to the Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques, worked out at the Conference of the Committee on Disarmament", *Conference of the Committee on Disarmament*, CCD/520, Annex A, 3 September 1976; see also a discussion in Goldblat, *Op. cit.*, pp. 93-97.

[63] See *Disarmament: Problems Related to Outer Space, Op. cit.*, p. 115.

[64] For a brief discussion, see CD/618, *op. cit.*, p. 22 (Canada).

[65] CD/618, *Op. cit.*, p. 23.

[66] *Loc. cit.*; and a study cited therein entitled *Outer Space: A New Dimension of the Arms Race*, by Bhupendra Jasani, Stockholm International Peace Research Institute, 1982, p. 111.

through the convening of a Consultative Committee of Experts. Complaints may also be lodged with the United Nations Security Council should there be any act or acts on the part of States Parties which is/are considered to breach the Conventions' obligations.

6. Moon Agreement, 1979[67]

This Agreement deals with arms limitation from a preventive standpoint and reiterates some of the obligations contained in Articles 3 and 4 of the Outer Space Treaty. However, the Agreement is not entirely repetitive, since it also reflects the need to define and further develop certain provisions concerning the Moon and other celestial bodies in earlier agreements. Thus, the Moon Agreement is a further attempt to prevent the moon and other celestial bodies from becoming areas of international conflict.

According to paragraphs 1 and 2 of Article 1, which define the scope of the environment within which the Agreement's prohibitions are applicable, the provisions relating to the moon shall include orbits around or other trajectories to or around it. References to the moon also apply to other celestial bodies within the solar system, short of exceptions concerning the Earth and in so far as other legal norms govern these celestial bodies.

While several other articles are relevant to the enforcement of space law in general, it is Article 3 which is particularly relevant to military activities in outer space:

> 1. The moon shall be used by all States Parties exclusively for peaceful purposes.
>
> 2. Any threat or use of force or any other hostile act or threat of hostile act on the moon is prohibited. It is likewise prohibited to use the moon in order to commit any such act or to engage in any such threat in relation to the earth, the moon spacecraft, the personnel of spacecraft or man-made space objects.
>
> 3. States Parties shall not place in orbit around or other trajectory to or around the moon objects carrying nuclear weapons or any other kinds of weapons of mass destruction or place or use such weapons on or in the moon.
>
> 4. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the moon shall be forbidden. The use of military personnel for scientific research or for any other peaceful purpose shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration and use of the moon shall also not be prohibited.

Although this Article is very similar to Article 4 of the Outer Space Treaty, some notable innovations have been introduced in paragraphs 2, 3, and 4. For example, paragraph 2 prohibits any threat or use of force or other hostile act, and any threat of hostile act on the moon. The inverse situation is also new, in that the earth and the moon are linked in a two-way prohibition of the threat or use of force. In other words, the moon may not be used as a location from which the hostile act or threat of use of force could be perpetrated on the earth, man-made spacecraft, etc. The Agreement does

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[67] See CD/618, *Op. cit.* (Canada); CD/933, *Op. cit.* (GDR); "Agreement Governing the Activities of States on the Moon and Other Celestial Bodies", *Official Records of the General Assembly*, A/RES/34/68, Annex, 1979; for a legal discussion of the Treaty, see C. Christol, *The Modern International Law of Outerspace*, 1982; for Soviet sources, see G. Zhukov & Y. Kolosov, International Space Law at xiii 1984; Du Shuhua, *Op. cit.*

not define the terms *use of force* and *hostile act* and this has led to some controversy, the French Government for instance declaring that:

> ...[the] provisions of Article 3, paragraph 2, of the Agreement relating to the use or threat of force cannot be construed as anything other than a reaffirmation, for the purposes of the field of endeavour covered by the Agreement, of the principle of the prohibition of threat or use of force, which States are obliged to observe in their international relations, as set forth in the United Nations Charter.[68]

As for paragraph 3, this clarifies and highlights stipulations in the Outer Space Treaty by prohibiting the placing of nuclear weapons or any other weapons of mass destruction on the moon or in its orbit. Paragraph 3 of Article 3 of the Moon Agreement, like the Outer Space Treaty, prohibits nuclear weapons or any other kind of weapons of mass destruction, but not conventional weapons. The emphatic character of the Agreement is also present in paragraph 4 of Article 3, which reiterates the prohibitions on military settlements and activities stipulated in Article 4 of the Outer Space Treaty by making specific reference to the moon. However, the lack of a definition of the term *any equipment or facility necessary for peaceful exploration and use* in paragraph 4 has left room for controversy and in a review of space law the Chilean delegation described this wording as 'ambiguous and imprecise'.[69] Nevertheless, the question which should perhaps be asked is whether the clarity of the Article's provisions and their relevance in the prevention of an arms race in outer space is affected?

The verification measures are of special interest to the PAROS, especially as they are similar to, though more specific, than those contained in the Outer Space Treaty. In this respect, at least three of the measures mentioned in Article 15 are felt to merit attention here. The first is the stipulation that each State Party may monitor compliance with the Agreement. Paragraph 1 allows for visits - under *reasonable advance notice* - to space vehicles, equipment, facilities, stations and installations on the moon. Such visits may be conducted by one or a group of State Parties, or through appropriate international procedures within the framework of the United Nations. As in the Outer Space Treaty, verification of these facilities and other platforms orbiting in outer space is not mentioned, although verification would apply to orbits around or other trajectories to or around the moon and other celestial bodies. The second measure concerns *in loco* inspections. For example, paragraph 2 allows requests to be made for consultations in the case of suspected non-compliance with the Agreement or of interference with the right of State Parties to monitor compliance, the results of any such consultations to be transmitted to all State Parties concerned. Lastly, paragraph 3 allows mediators to be introduced into consultations. A peaceful settlement of a dispute could then take place with the assistance of either another State Party or the Secretary-General of the United Nations.

The verification provisions in this Agreement are more intrusive than those in the Outer Space Treaty and the ENMOD Convention. Nevertheless, they do have some constraints and are not strict mandatory procedures (e.g., without prior notification) nor are they, as is often pointed out,[70] as open as the provisions of the Antarctic Treaty.

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[68] See the Treaty text and list of signatures and declarations.
[69] CD/915, *Op. cit.*, p. 5 (Chile).
[70] Du Shuhua, *Op. cit.*

One last observation concerns adherence to the Moon Agreement. Although it contains some very important principles of space law which have been accepted in other instruments, it has been signed or ratified by only 13 States.[71] Apart from France (which has signed but not ratified the Agreement), none of the contracting Parties to the Agreement is a permanent member of the Security Council nor are any of them potentially space-competent States, i.e., the States that are most likely to have first access to celestial bodies. It may therefore be asked if this is a reflection on the importance of the Agreement. Is the Outer Space Treaty regarded as covering all the essential aspects of the Moon Agreement? Or is it, as suggested by some observers, because of other less militarily-related considerations such as the statement in Article 11 that the moon and its natural resources are the common heritage of mankind and not subject to national appropriation (paragraphs 1 and 2).[72] Be that as it may, apart from the call for adhesion to security agreements in general, no comprehensive proposal has been tabled in the CD for an amendment to the Moon Agreement, not even by States which were proponents of the Moon Agreement.

B. General Provisions Concerning Activities in Outer Space

A number of legal instruments with an indirect bearing on international security in the areas of arms limitation and disarmament have been scrutinized by the CD and the *Ad Hoc* PAROS Committee. The results of these examinations of their purpose and scope have shown that, although they are not directly related to weaponry as such, they are central to the exploration and use of outer space and consequently have some potential in the development of confidence-building measures among States.

Two of the instruments which have been examined are the 1968 Rescue Agreement and the 1972 Liability Convention.[73] These may not appear, at first sight, to be relevant to military activities in outer space in any way, especially as they are not based on the politico-military standpoint of arms limitation and disarmament, their purpose being to establish rules and procedures to strengthen international co-operation in outer space. For example, in the Liability Convention, this is developed via equitable measures of compensation to victims of damage caused by the launching of objects in outer space or the actual flight of such objects.

However, by establishing rules of liability in the event of damage resulting from space activity, the Liability Convention is potentially relevant to military activity in space, as has been reasoned on two accounts in the Canadian survey mentioned earlier in this chapter.[74] First, the Convention reiterates the declaration that States are legally responsible for any use they make of space objects including, presumably, military activity. Needless to say, acceptance by the international community of the inclusion of military activity within the framework of space law of liability is vital to the negotiation of an agreement on the PAROS. While the Convention does not specifically mention

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[71] See, for instance, CD/618, *Op. cit.*, p. 24 (Canada).

[72] Du Shuhua, *Op. cit.*

[73] CD/618, *Op. cit.* (Canada); CD/933, *Op. cit.* (GDR); "Agreement on the Rescue of Astronauts, the Return of Astronauts, and the Return of Objects Launched into Outer Space," *United Nations Treaty Series*, vol. 119; "Convention on International Liability for Damage Caused by Space Objects," *United Nations Treaty Series*, vol. 961.

[74] CD/618, *Op. cit.*, pp. 16-17.

military activity in outer space, the text does leave open the possibility of damage caused by a voluntary act of some kind and so does not specifically exclude military-related damage. Thus, Article 6 states:

> 1. Subject to the provisions of paragraph 2 of this Article, exoneration from absolute liability shall be granted to the extent that a launching State establishes that the damage has resulted either wholly or partially from gross negligence or from an act or omission done with *intent to cause damage on the part of a claimant State or of natural or juridical persons it represents.*
>
> *2. No exoneration whatever shall be granted in cases where the damage has resulted from activities conducted by a launching State which are not in conformity with international law including, in particular, the Charter of the United Nations and the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and other Celestial Bodies.*[75]

Article 6 has aroused controversy because of the two legal instruments mentioned in paragraph 2 and the stipulation of conformity with international law, the main debate being centred around the issues of the threat or use of force and the peaceful settlement of disputes.

Furthermore, it should not be overlooked that damage liability could conceivably result from incidents caused to a third party by the testing, deployment, or use of weapons in outer space.[76] The occurrence of such incidents becomes even more plausible in the context of the present and foreseeable use of outer space where space military-related activity overwhelms non-military use. In spite of the fact that the Liability Convention is not an arms limitation document nor directly related to military activity in outer space, most delegations at the CD do seem to regard it as an important component in the international body of space law before the *Ad Hoc* PAROS Committee.

Another instrument of positive law is the 1982 Nairobi Convention of the International Telecommunication Union (ITU) - which is to be replaced by the 1989 Nice Constitution.[77] This is seen by some delegations as having some bearing on the Committee's work since it establishes the framework for the use of the radio-frequency spectrum of geostationary and other satellite orbits, including deep space, by Member States. Nevertheless, under the provisions of Article 38, paragraph 2, members have full freedom in respect of their national defence installations, including the services for the army, navy, and air force. The relevance of this Convention to military activity in outer space is also seen in Article 35, which addresses the issue of harmful interference with radio communication services, paragraph 1 stating that:

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[75] Emphasis added.

[76] See, for example, CD/618, *Op. cit.*, p. 17 (Canada).

[77] CD/618, *Op. cit.* (Canada); CD/933, *Op. cit.* (GDR); the 1982 Nairobi Convention is a legally binding instrument which will be replaced by the 1989 Nice instrument when it comes into force 30 days after ratification by 55 Member - to this date, however, only two States have ratified it. The content of the Articles of interest to the present review will not change, although they have been renumbered and relocated, e.g., from the Convention part to the Constitution part. See *International Telecommunication Convention.* Nairobi, 1982, General Secretariat of the International Telecommunication Union, Geneva, ISBN 92-61-01651-0; "Constitution and Convention of the International Telecommunication Union," Nice, 1989, *International Telecommunication Union*, General-Secretary, Geneva, 1989, PP-89\FINACTS\CONVO1E1.TXS.

> All stations, whatever their purpose, must be established and operated in such a manner as not to cause harmful interference to the radio services or communications of other Members or of recognized private operating agencies, or of other duly authorized operating agencies which carry on radio service, and which operate in accordance with the provisions of the Radio Regulations.

Yet another reference is to be found in paragraph 3 of the same Article:

> Further, the Members recognize the desirability of taking all practicable steps to prevent the operation of electrical apparatus and installations of all kinds from causing harmful interference to the radio services or communications mentioned in [Article 35, paragraph 1] above.

Article 38, paragraph 2, also introduces a provision regarding this issue but this time concerning military radio installations:

> ...these installations must, so far as possible, observe statutory provisions relative to giving assistance in case of distress and to the measures to be taken to prevent harmful interference, and the provisions of the Administrative Regulations concerning the types of emission and the frequencies to be used, according to the nature of the service performed by such installations.

For information, the term *harmful interference* has been defined in the Convention as an act which "...endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with the Radio Regulations".[78] Radiocommunication, in turn is to be understood as a telecommunication by means of electromagnetic waves of frequencies lower than 3000 GHz and which are propagated in space without an artificial guide. It should be also noted that while members have all freedom as far as the installations of their army, naval and air forces are concerned, the Radio Regulations attached to the Convention do not draw any distinction between civil and military satellite functions, nor do they distinguish telecommunications satellites from early-warning or reconnaissance satellites.

While there is no doubt as to the importance of the ITU Convention in the regulation of harmful interference within a régime which encompasses space communications, several imponderables are still the subject of debate. For instance, it has been asked whether Article 35 alone prohibits the use of military electronic interference in outer space? One other question that may be posed is: Are measures such as electronic jamming (involving devices other than telecommunication satellites) prohibited if Articles 35 and 38 are read together? Or, *in extremis*, would it also be necessary to consider Article 37, in which members agree to take "...the steps required to prevent the transmission or circulation of false deceptive distress, urgency, safety or identification signals, and to collaborate in locating and identifying stations under their jurisdiction transmitting such signals"? Further, would interference include, as some argued in some quarters, ASAT attacks?

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[78] *International Telecommunication Convention*, Annex 2, p. 148.

In attempting to answer these questions, delegations have tabled a series of papers suggesting ways of ensuring absolute immunity for satellites. For example, France has suggested a joint USSR/USA pledge that they will accord the immunity provisions of certain of their space objects to the satellites of third countries.[79] France has also proposed that the international community should recognize the principle of non-interference with satellites enumerated in the bilateral USSR/USA instruments,[80] a principle France considers to be customary practice to some extent. Sweden has also shown interest in the immunity of satellites,[81] and has supported the first of the French proposals mentioned above. However, Sweden would also like the ITU Nairobi Convention and the Outer Space Treaty to be strengthened and has advocated legal protection for civil activities in outer space. Sweden has also taken the view that any damage or disturbance to, or harmful interference with, the normal functioning of permitted space objects should be forbidden. This delegation also believes that there should be specific regulations to diminish the risk of accidents in low and high orbits, particularly in the geostationary or geosynchronous and eccentric earth orbits which are crucial for international stability and security (where reconnaissance satellites with photographic, electronic or ocean-surveillance functions are situated).[82] This has long been supported by Australia, whose view is that the *Ad Hoc* Committee should ensure that all the satellites (and their associated ground stations) verifying arms control and disarmament are protected from attack.[83]

An important complement to the Outer Space Treaty is the *Convention on Registration of Objects Launched into Outer Space* (the Registration Convention), which came into being as a follow-up to a United Nations General Assembly resolution adopted in 1961[84] and which was itself adopted by another General Assembly resolution on 12 November 1974.[85] Since the Convention's main purpose is to ensure that States maintain national records of the objects they launch into outer space, it constitutes a far more positive attempt to set up an international registration system than the provisions contained in the 1961 resolution, the Outer Space Treaty, or the Liability Convention. The Registration Convention calls on States Party to maintain a central registry and to provide the Secretary-General of the United Nations with information on the space objects they have launched, as a supplementary means of identifying space objects and applying the rules governing outer space. Paragraph 1 of Article 2 of the Convention reads as follows:

> When a space object is launched into earth orbit or beyond, the launching State shall register the space object by means of an entry in an appropriate registry which it shall maintain. Each launching State shall inform the Secretary-General of the United Nations of the establishment of such a registry.

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[79] CD/PV 263, *Op. cit.*, p. 22.

[80] For a discussion on this proposal, see *infra*, Part II, Chapter I. See also CD/937, *Op. cit.* (Canada); "Main Provisions of a Treaty on the Prohibition of Anti-Satellite Weapons and Ways to Ensure the Immunity of Space Objects," submitted by the German Democratic Republic and the Mongolian People's Republic to the *Conference on Disarmament*, CD/777, 31 July 1987.

[81] CD/PV 516, *Op. cit.*, pp. 18-20.

[82] CD/PV 516, *Op. cit.*, p. 15-19.

[83] See "Statement submitted by Australia to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 508, 13 June 1989, p. 27.

[84] "International Co-operation in the Peaceful Uses of Outer Space", *Official Records of the General Assembly*, A/RES/1721 (XVI), 20 December 1961. (See *infra*, Annex B.)

[85] "Convention on Registration of Objects Launched into Outer Space," *United Nations Treaty Series*, vol. 1023, pp. 15-19.

Paragraph 3 of the same Article affords a large degree of flexibility in that the State concerned shall be free to determine the information contained in its registry, and the conditions under which it is maintained. In contrast, the provisions of Articles 3 and 4 delineate the mandatory reporting of space launches and the structure of the uniform system to be maintained by the Secretary-General, as follows:

> 1. Each State of registry shall furnish to the Secretary-General of the United Nations, as soon as practicable, the following information concerning each space object carried on its registry:
> (a) name of launching State or States;
> (b) an appropriate designator of the space object or its registration number;
> (c) date and territory or location of launch;
> (d) basic orbital parameters, including:
> (i) nodal period,
> (ii) inclination,
> (iii) apogee,
> (iv) perigee;
> (e) general function of the space object.
> 2. Each State of registry may, from time to time, provide the Secretary-General of the United Nations with additional information concerning a space object carried on its registry.
> 3. Each State of registry shall notify the Secretary-General of the United Nations, to the greatest extent feasible and as soon as practicable, of space objects concerning which it has previously transmitted information, and which have been but no longer are in earth orbit.

CD delegations often quote this Convention as an important security instrument in international space law, because of an assumed correlation between full knowledge of the presence of objects in outer space on the one hand, and the peaceful and rational use of that environment on the other, the former being a prerequisite to the existence of the latter. In support of this view, the Argentine delegation has described the gathering of specific information on the nature and functions of objects launched into outer space as an "...indispensable data base for any subsequent development designed to generate confidence in the uses of outer space"[86]

Other delegations have envisaged a even wider interpretation, arguing that the Convention provides protection for objects launched into outer space on the basis that the right of exclusive jurisdiction over a space object as granted to a launching State in Article 1 "...does not permit foreign intervention [and] still less does it permit armed attack on a spacecraft or space station".[87] It is even argued that:

> Only the State of registry is permitted to exercise jurisdiction over its spacecraft in outer space or on celestial bodies, and even to destroy them, provided it does not damage third parties or the environment.[88]

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[86] "Statement submitted by Argentina to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 566, 19 July 1990, p. 11; see also a working paper entitled "Proposals for the Strengthening of the Régime Established by the Convention on Registration of the Objects Launched into Outer Space," submitted by Argentina to the Conference on Disarmament, *Conference on Disarmament*, CD/1015, 18 July 1990.

[87] CD/915, *Op. cit.*, p. 6 (Chile).

[88] *Loc. cit.*

Nevertheless, several countries have proposed certain structural changes to rectify a number of inconsistencies and shortcomings in the Registration Convention.[89] For example, Argentina has stressed the need for more countries to adhere to the Convention and for those which are State Parties to improve their compliance with the terms of its provisions.[90] The failure of States to report military-oriented missions has not gone unnoticed, especially as activity in outer space is often either directly or indirectly military in nature.[91] This call for improvement has also been supported by Canada, France, India, the Netherlands, Sweden, and Venezuela, although they have recognized that the collection of data identifying objects launched into space and their return has made the management of space traffic more coherent.[92] Several delegations have argued that more stringent provisions regarding the type of data to be collected, its actual collection, and changes in orbital parameters - which are not presently subject to mandatory reporting - would provide greater transparency and foster confidence among States. It is also argued that the creation and maintenance of a data base require more-stringent identification procedures for space objects - e.g., identification marks for space objects.

Another important aspect of the Convention is the monitoring mechanism foreseen in Article 6 as follows:

> Where the application of the provisions of this Convention has not enabled a State Party to identify a space object which has caused damage to it or to any of its natural or juridical persons, or which may be of hazardous or deleterious nature, other States Parties, including in particular States possessing space monitoring and tracking facilities, shall respond to the greatest extent feasible to a request by that State Party, or transmitted through the Secretary-General on its behalf, for assistance under equitable and reasonable conditions in the identification of the object. A State Party making such a request shall, to the greatest extent feasible, submit information as to the time, nature and circumstances of the events giving rise to the request. Arrangements under which such assistance shall be rendered shall be the subject of agreement between the parties concerned.

At least three elements should be noted in this Article. The first is the concept of collective assistance to identify an object in space which has caused some kind of damage to a State Party, an idea which has also been discussed in connection with the verification provisions of any international monitoring system that might be conceived

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89 See, for example, "Statement submitted by Canada to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 468, 26 July 1988, pp. 2-5; Argentina Statement submitted by Argentina to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 423, 21 July 1987, pp. 5-7, CD/PV 566, *Op. cit.*; France - CD/PV 263, *Op. cit.*, CD/PV 303, *Op. cit.*, CD/937, *Op. cit.*; India - CD/PV 423, *Op. cit.*; Netherlands - "Statement submitted by the Netherlands to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 481, 13 September 1988, pp. 16-17, CD/PV 498, *Op. cit.*; Pakistan - CD/PV 413, *Op. cit.*, "Statement submitted by Pakistan to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 460, 26 April 1988, pp. 13-15; Sri Lanka - CD/PV 404, *Op. cit.*; Sweden - CD/PV 252, *Op. cit.*; and Zaire - CD/PV 461, *Op. cit.* Other support for the strengthening of the Registration Convention by requesting State parties to provide, say, more detailed information on the specification and purpose of objects launched into outer space, has been expressed by Australia and Canada in working papers to the *Ad Hoc* Committee.

90 CD/PV 566, *Op. cit.*, p. 11; also see "Statement submitted by Canada to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 510, 20 June 1989, p. 13.

91 CD/PV 566, *Op. cit.*, p. 11 (Argentina).

92 CD/PV 263, *Op. cit.*, p. 22 (France); "Statement submitted by India to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 486, 14 February 1989, p. 6; "Statement submitted by Canada to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 492, 7 March 1989, p. 7; CD/PV 498, *Op. cit.*, p. 8 (Netherlands); CD/PV 516, *Op. cit.*, p. 18 (Sweden); CD/618, *Op. cit.*, p. 21 (Canada).

by the *Ad Hoc* PAROS Committee. The second is that the Article also sets out the active role space monitoring and tracking facilities are expected to play in verifying compliance with outer space agreements. Thirdly, the monitoring mechanism has been conceived in such a way that any assistance would be the result of arrangements between State Parties. The voluntary character of this monitoring is indicative of the role that confidence-building measures are expected to play.

C. Summary

As has been recognized by, *inter alia*, the *Ad Hoc* PAROS Committee, there is no comprehensive international agreement covering all types of military activity in outer space, nor does the body of international public law on outer space in and by itself cover this vast spectrum of activity.[93] It therefore follows that the international body of law should not be regarded as relevant to military activity in outer space only from the aspect of arms limitation, because there are other international instruments which, although regulating only general activities in outer space, can have implications for military activity in that environment. Nevertheless, a clear distinction needs to be made between arms limitation proper and collateral or confidence-building measures.

The lack of a comprehensive legal structure should not conceal the fact that an institutionalized juridical framework does exist in respect of present and potential military activity in outer space. Thus, Tables VII and VIII group a selection of the principal multilateral and bilateral military limitations, prohibitions, and other provisions related to outer space, the moon, and other celestial bodies. The Tables are simply intended to serve as a chronological recapitulation of the international legal instruments which constitute positive outer space law as well as of the instruments which, though not in force, States have declared their intention to respect.

There is general recognition that, while this international body of law has not been able to avert the military use of outer space by States, it has nevertheless helped to prevent an arms race in that environment. The general consensus of opinion is that most of the existing international agreements on the potential use of outer space were drawn up in response to the technological developments that had just or were about to take place at the time. That present-day technology and its possible evolution in the next three decades requires a more-detailed tailor-made international régime has been emphasized by fears, on the part of some countries, that experiments on SD systems may seriously and negatively affect the status of positive law on outer space. Fears that there

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[93] This includes military space-to-space, space-to-earth, earth-to-space, and air-to-space activity. See CD/1034, *Op. cit.*, p. 9,11 (*Ad Hoc* PAROS Committee); CD/PV 529, *Op. cit.*, p. 8-10 (India); "Statement submitted by Austria to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 525, 10 August 1989, p. 5; CD/PV 502, *Op. cit.*, p. 2-5 (FRG); "Statement submitted by Brazil to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 508, 13 June 1989, p. 13-19; CD/PV 543, *Op. cit.*, p. 20 (Venezuela); CD/PV 933, *Op. cit.*, p. 2-4 (GDR); "Statement submitted by Morocco to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 569, 31 July 1990, p. 6; on behalf of the Group of 21, see CD/PV 547, *Op. cit.*, p. 14 (Argentina); "Statement made by Japan to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 530, 29, August 1989, p. 6; CD/PV 525, *Op. cit.*, p. 26 (China). Also see "Statement submitted by Nigeria to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 588, 21 March 1991, p. 8; CD/PV 588, *Op. cit.*, p. 18 (Venezuela); "Statement submitted by Morocco to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 596, 20 June 1991, p. 4.

Table VII

MULTILATERAL LEGAL INSTRUMENTS CONTAINING PROVISIONS RELATED TO OUTER SPACE, THE MOON, AND OTHER CELESTIAL BODIES[1]

INTERNATIONAL AGREEMENT/TREATY	• Place of signature • Date of signature • Entry into force • Depository	• Duration • Contracting parties[11]	RELEVANCE TO THE PREVENTION OF AN ARMS RACE IN OUTER SPACE Article(s) & Content
• Charter of the United Nations (UN Charter)	San Francisco 26 June 1945 24 October 1945 United Nations	Unlimited 159 members	Art. 2, para. 4: prohibits the threat or use of force against any State in all environments; Art. 51: recognizes the right of individual or collective self-defence in response to an armed attack.
• Treaty Banning Nuclear Weapons Tests in the Atmosphere, in Outer Space and Under Water (Partial Test-Ban Treaty)	Moscow 5 August 1963 10 October 1963 UK, USSR, and USA	Unlimited Right of withdrawal 119 members	Art. 1, para. 1: engages State Parties to prohibit, to prevent, and not to carry out any nuclear weapon test explosion or any other nuclear explosion; para. 2: refrain from causing, encouraging, or in any way participating in any nuclear weapon test explosion, or any other nuclear explosion.
• Treaty on Principles Governing the Activities of States in the Exploration of Outer Space, including the Moon and other Celestial Bodies (Outer Space Treaty)	London, Moscow, Washington 27 January 1967 10 October 1967 UK, USSR, USA	Unlimited Right of withdrawal 93 members	Art. 4: prohibits the placing into orbit around the Earth of any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, the installation of such weapons on celestial bodies, or the stationing of such weapons in outer space in any manner. It also prohibits the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies; Art. 10: establishes verification provisions for the observance of the flight of objects launched in space; Art. 12: stipulates that all installations, equipments, and space vehicles shall be open to representative of other State Parties.

• Convention on the Registration of Objects Launched into Outer Space (Registration Convention)	New York 14 January 1975 15 September 1976 UN General Assembly	Unspecified Right of withdrawal 37 members	Art. 4: stipulates the framework for reporting to the UN Secretary-General information regarding date and location of the launching of objects in space, changes in orbital parameters after launch, recovery date of the spacecraft, and its general functions.
• Convention on the Prohibition of Military or any other Hostile Use of Environmental Modification Techniques (ENMOD Convention)	New York 18 May 1977 5 October 1978 UN General Assembly	Unlimited¶¶¶ Right of withdrawal 55 members	Art. 1 and 2: prohibit the military or hostile use of environmental modification techniques, which would damage - through the deliberate manipulation of natural processes - the dynamics, composition or structure of the earth, including its biota, lithosphere, hydrosphere and atmosphere, or of outer space; Art. 9: verification procedures.
• Agreement Governing the Activities on the Moon and Other Celestial Bodies (Moon Agreement)	New York 18 December 1979 11 July 1984 UN General Assembly	Unlimited¶¶¶¶ Right of withdrawal 7 members	Art. 1, para. 1: The Provisions of this Agreement relating to the moon shall also apply to other celestial bodies within the solar system, other than the Earth, except in so far as specific legal norms enter into force with respect to any of these celestial bodies; para 2: for the purposes of this Agreement reference to the moon shall include orbits around or other trajectories to or around it. Art. 3 para. 1: provides that the moon shall be used exclusively for peaceful purposes; para. 2: prohibits any threat or use of force or any other hostile act or threat of hostile act on the moon; the use of the moon as a base to commit any such act or to engage in any such threat in relation to the earth, the moon spacecraft, the personnel of spacecraft, or man made-space objects; para. 3: prohibits the placing in orbit around or other trajectory to or around the moon and objects carrying nuclear weapons or any other kinds of weapons of mass destruction or place or use such weapons on or in the moon; para. 4: prohibits the establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on the moon; Art. 15: verification provisions.
• International Telecommunication Union Convention (ITU Convention)	Nairobi 6 November 1982 1 January 1984 UN General Assembly	Unlimited¶¶¶¶¶ Right of withdrawal 164 members	Art. 35, para. 1: establishes the responsibility of the International Telecommunication Union for the allocation of radio-frequencies for all outer space activities aimed at avoiding any harmful interference of the radio spectrum; Art. 38, paras. 1 and 2: State members retain entire freedom with regard to military radio installations of their army, naval and air forces.

¶= Legal instruments negotiated and signed, not necessarily ratified; ¶¶= Membership (ratification, accession, succession) as of 1 January 1990; ¶¶¶= Requires a Review Conference every five years or under special circumstances; ¶¶¶¶= Review Conference to be decided by the United Nations General Assembly in 1994; ¶¶¶¶¶= The present text of the Convention will be replaced by a 1989 text after ratification by the 55th country.

Table VIII

BILATERAL LEGAL INSTRUMENTS CONTAINING PROVISIONS RELATED TO OUTER SPACE, THE MOON, AND OTHER CELESTIAL BODIES[¶]

INTERNATIONAL AGREEMENT/TREATY	• Place of signature • Date of signature • Entry into force • Depository	• Duration • Contracting parties	RELEVANCE TO THE PREVENTION OF AN ARMS RACE IN OUTER SPACE Article(s) & Content
• Agreement Between the USA and the USSR on Measures to Reduce the Risk of Outbreak of Nuclear War (Nuclear Accidents Agreement)	Washington 30 September 1971 30 September 1971	Unlimited USSR, USA	Art. 3: requires States Party to notify each other of any sign of interference with missile warning systems or related communications facilities if such interference could create a risk of outbreak of nuclear war.
• Agreement Between the USA and the USSR on Measures to Improve the Direct Communications Link (Hot Line Agreement)	Washington 30 September 1971 30 September 1971	Unspecified USSR, USA	Provides the establishment of a satellite communications system, with each party selecting a system of its own choice.
• Treaty between the USA and the USSR on the Limitation of Anti-Ballistic Missile Systems (ABM Treaty)	Moscow 26 May 1972 3 October 1972	Unlimited[¶¶] Right of withdrawal USSR, USA	Art. 5, 6 and 9: limit the number of possible deployment of ABM systems to two. Prohibit the development, testing, or deployment of ABM systems or components which are sea-based, air-based, space-based, or mobile land-based; Art. 12, paras. 1 and 2: provides for verification measures by National Technical Means (NTMs), as well as establishing the principle of non-interference with NTMs.
• Protocol to the Treaty between the USA and the USSR on the Limitation of the Anti-ballistic Missile Systems (Protocol to the ABM Treaty)	Moscow 3 July 1974 24 May 1976	Unlimited USSR, USA	Limits the number of possible deployment of ABM systems to one.
• Interim Agreement between the USA and the USSR on Certain Measures with Respect to the Limitation of Strategic Offensive Arms (SALT I)	Moscow 26 May 1972 3 October 1972	Five years (Expired in 1977)[¶¶¶] USSR, USA	Art. 5, para. 1: provides for verification measures by National Technical Means (NTMs), as well as affirming the principle of non-interference with NTMs.

• Treaty between the USA and the USSR on the Limitation of Strategic Offensive Arms (SALT II)	Vienna 18 June 1979 Has never entered into force	Five years (Expired in 1985) USSR, USA	Art. 15, paras. 1, 2 and 3: provides for verification measures by National Technical Means (NTMs), as well as confirming the principle of non-interference with NTMs; Art. 9, para. 1 (c): each State party undertakes not to develop, test or deploy systems for placing into Earth orbit nuclear weapons or any other weapons of mass destruction, including fractional orbital missiles.
• Agreement Between the United States of America and the Soviet Socialist Republics on the Establishment of Nuclear Risk Reduction Centers	Washington 15 September 1987 15 September 1987	Unlimited Right of withdrawal USSR, USA	Protocol I, Art. 1: provides for the notification of ballistic missile launches under Article 4 of the 1971 Nuclear Accidents Agreement, and under paragraph 1 of Article 6 of the 1972 Prevention of Incidents on and over High Seas Agreement. Protocol II, Art. 1: provides for the establishment and maintenance of facsimile communications between each party's national Nuclear Risk Centers (an INTELSAT satellite circuit and a STATIONAR satellite circuit).
• Treaty Between the United States and the Union of the Soviet Socialist Republics on the Elimination of Their Intermediate-Range and Shorter-Range Missiles (INF Treaty)	Washington 8 December 1987 1 June 1988	Unlimited Right of withdrawal USSR, USA	Art. 12, para. 1: provides for verification measures by National Technical Means (NTMs); para. 2, subpara. (a) confirms the principle of non-interference with NTMs.
• Agreement Between the United States of America and the Soviet Socialist Republics on Notifications of Launches of Intercontinental Ballistic Missiles and Submarine-launched Ballistic Missiles (Notifications of Launches Agreement)	Moscow 31 May 1988 31 May 1988	Unlimited Right of withdrawal USSR, USA	Art. 1: provides for notification, no less than twenty-four hours in advance, of planned date, launch area, and area of impact for any launch of a strategic ballistic missile (ICBM or SLMB); including the geographic coordinates of the planned impact area or areas of the reentry vehicles.
• Agreement Between the Government of the United States of America and the Government of the Union of Soviet Socialist Republics on the Prevention of Dangerous Military Activities (Prevention of Dangerous Military Activities Agreement)	Moscow 12 June 1989 1 January 1990	Unspecified Right of withdrawal USSR, USA	Prevention of dangerous military activities involving lasers and interference with command and control networks: Art. 2, paras. (b) and (d); Art. 4; Art. 6.

¶= Including legal instruments signed but not necessarily ratified; ¶¶= Requires a Review Conference every five years; ¶¶¶= Both sides have agreed to abide by the terms of the agreement after the date of expiration.

might be a withdrawal from the ABM Treaty have also been expressed as has the concern that certain types of space activity may even intensify the arms race.[94]

The desire to strengthen the international legal régime is a genuine attempt to prevent legal norms from lagging behind militarily-related technological developments. However, closing the gap between military-related activity in outer space and international law, and thus preventing an arms race in outer space, is a laborious task. The present situation has been well summarized in an Argentinean paper which referred to the two schools of thought in the Committee. Both pursue the same basic objectives but each has a different standpoint:[95] one school feels there is a need to strengthen the existing agreements which are directly related to the military aspects of the use of outer space, while the other takes the view that any initiative aimed at fostering transparency and confidence-building in outer space activity, even if these are measures which are not fully classifiable as arms limitation and disarmament requirements, are to be welcomed as useful contributions to the central objective of the *Ad Hoc* PAROS Committee.[96]

For the time being, however, there is no consensus as to how the CD and the *Ad Hoc* Committee should move forward.[97] Some delegations feel that all the approaches suggested should be undertaken at the same time, while others, in growing number, feel that priorities should be assigned. Thus, it is often argued that one of the first needs is to agree on specific, well-defined goals, and that a selection be made of the issues requiring the speediest treatment which the Committee could reasonably be expected to consider in the early negotiating stages.

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[94] See, inter alia, CD/1034, *Op. cit.*, p. 12 (*Ad Hoc* PAROS Committee).

[95] For the Argentinean assessment of the situation, see CD/1015, *Op. cit.*, pp. 2-3.

[96] *Loc.cit.*

[97] See CD/PV 498, *Op. cit.*, p. 8 (Netherlands); "Letter Dated 1 August 1989 Addressed to the Secretary-General of the Conference on Disarmament by the Permanent Representative of Polish People's Republic Transmitting a Working Paper Entitled 'Confidence-Building Measures Related to Item 5'," CD/941, 1 August 1989, p. 2; and CD/937, *Op. cit.*, p. 3 (France).

PART II:

PREVENTION OF AN ARMS RACE

IN

OUTER SPACE

CHAPTER I: PROPOSALS RELATED TO EXISTING AGREEMENTS

This chapter reviews the salient features of the proposed amendments to existing agreements which have been submitted to the CD for consideration, and a summary of the main arguments of the countries supporting or opposing them. As might be expected, several of these proposals have concerned the Outer Space Treaty, but there have also been initiatives to reinforce or expand the scope of bilateral agreements on arms limitation such as the ABM Treaty.

A. Outer Space Treaty

Most of the initiatives to improve the Outer Space Treaty attempt to close the gap regarding the placing into orbit of conventional or other weapons which are not considered to be weapons of mass destruction irrespective of whether they are produced according to kinetic energy or directed energy kill principles. Thus, the proposals received have suggested, *inter alia*: an entirely new treaty, the addition of a protocol to the existing Treaty, and an amendment to the Treaty as permitted in its Article 15.[1]

A memorandum suggesting a widening of the scope of the Outer Space Treaty's provisions was submitted by Italy in 1979.[2] This was largely inspired by the developments that were then taking place in space technology, thus giving rise to considerable concern that weapons which were not covered by prohibitions in Article 4 of the Treaty, particularly weapons such as the interceptor/destructor and hunter-killer satellites, might be used in outer space. The Italian document suggested a total ban on such military activities as the development and use of earth or space-based systems designed to damage, destroy, or interfere with the operations of other States' satellites.[3] It also put forward a draft Protocol, called an *Additional Protocol*, to the Treaty. Article I of this draft reads as follows:

> Outer Space, including the moon and other celestial bodies, shall be used for peaceful purposes only. States Parties to this protocol undertake to refrain from engaging in, encouraging or authorizing, directly or indirectly, or in any way participating in any measures of military or other hostile nature, such as the establishment of military bases, installations and fortifications, the stationing of devices having the same effect, the launching into earth orbit or beyond of objects carrying weapons of mass destruction or any other types of devices designed for offensive purposes, the conduct of military manoeuvres, as well as the testing of any type of weapons.[4]

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[1] See, for example, *infra*, Part II, Chapter II, A.

[2] CD/9, *Op. cit.* For similar earlier proposals, see *Official Records of the General Assembly*, A/7221, 9 September 1968; *Official Records of the General Assembly*, A/AC. 187/97, 1 February 1978, and paragraph 80 of the Programme of Action of the Final Act of the Special Session on Disarmament, *Op. cit.*

[3] *Ibid.*, p. 2.

[4] *Ibid.*, Annex I, p. 1.

Thus, this provision would extend the existing prohibitions on the stationing and testing in Earth orbit or beyond to all weapons. However, the memorandum did also stress that this far-reaching ban should concern only non-peaceful military activity, thereby acknowledging that the use of reconnaissance, surveillance and communications satellites, as well as any space system to reinforce strategic stability - by, say, the verification of arms limitation agreements - was important in maintaining international security and should therefore not be banned.[5] This was the reason for the provision in Article 1, paragraph 2, of the proposed *Additional Protocol* that its stipulations should not prevent the use of "...any control system to be established in order to ensure compliance with disarmament and security agreements".[6] The Italian memorandum also supported the development of proposals to establish a basis for the use of technical means of multilateral verification, and the creation of the so called International Satellite Monitoring Agency as proposed by France in 1978.[7] Nevertheless, although Articles 2 and 3 laid down procedures to ensure compliance, the draft *Additional Protocol* did not itself actually propose the use of technical means for verification.

Other examples of the desire to reinforce the Outer Space Treaty were the amendments proposed by Peru and Venezuela.[8] The Venezuelan delegation argued that a simple amendment would suffice to turn the Treaty's partial prohibition into a total ban, i.e., by adding the words "or any type of space weapons" to Article 4.[9] Venezuela also proposed the insertion of a new paragraph under which State Parties would undertake not to develop, produce, store or use space weapons. It was further suggested (1) that the ban on the deployment of nuclear weapons and weapons of mass destruction in space be extended to "...any other kind of weapon that could be conceived for use in space, from space or into space"[10] and (2) that there be an amendment calling on States "...not to place in orbit around the earth, or deploy in their territories or any other place under their jurisdiction, any kind of space weapons or systems of such weapons."[11]

However, on this issue the Peruvian delegation suggested a wider ban, as follows:

> "...it is also desirable to contemplate the negotiation of an Additional Protocol for the purpose of prohibiting the development, production, storage and deployment of antisatellite weapon-systems which are not stationed in outer space. Also, the same Protocol will have to contain supplementary provisions relating to the limitation of antiballistic-missile systems, whatever their nature."[12]

On the question of how to ensure that a total ban on space weapons be observed, the Venezuelan delegation proposed that there be a Protocol setting forth appropriate verification mechanisms to supplement the provisions of Articles IX to XII, and on the

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[5] *Ibid.*, pp. 2-3.

[6] *Ibid.*, Annex I, p. 1.

[7] For details of this and other institutional monitoring and verification arrangements, see *infra*, Part II, Chapter IV.

[8] For Peru, see "Proposal for Amendment of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies," submitted by Peru to the *Conference on Disarmament*, CD/939, 28 July 1989; CD/PV 472, *Op. cit.*, pp. 6-7; CD/PV 544, *Op. cit.*, pp. 6-8. For Venezuela, refer to CD/851, *Op. cit.*; see also "Statement submitted by Venezuela to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 398, 19 March 1987, and CD/PV 471, *Op. cit.*

[9] CD/PV 398, *Op. cit.*, p. 9

[10] CD/PV 471, *Op. cit.*, p. 24.

[11] *Loc. cit.*

[12] See CD/939, *Op. cit.*, p. 2.

issue of Earth-based space weapons it proposed that a mechanism to verify them "...could benefit from the techniques and methods applicable to long-range and intermediate-range nuclear forces".[13]

These Venezuelan proposals clearly differentiated themselves from the more usual calls for a ban on weapons in outer space for two main reasons, as follows. One, the proposed additional paragraph introduced a new type of prohibition into the Outer Space Treaty and into space law in general since neither of these does not, as yet, cover the development, production, storage or use of space weapons. Second, the proposed paragraph referred to the three different application modes - space-to-space, space-to-Earth, Earth-to-space - which, again, is not the case at present.

While the Venezuelan proposals have found some support in principle, particularly among Group of 21 delegations and the former Group of Socialist countries, some of their aspects have nevertheless been questioned by those same delegations. For example, Peru considered the introduction of such new elements as the concept of "space weapons" unnecessary, on the grounds that what defines the prohibition in the Treaty is non-placement in orbit.[14] For its part, the Soviet delegation, while not disapproving of the proposed amendments,[15] stated that, given the nature of the proposals and the fact that any such amendment would affect the State Parties's obligations in an existing treaty, this type of initiative could only be successful if the *Ad Hoc* Committee reached consensus on the matter.

However, all of these initiatives to reinforce the Outer Space Treaty also raised the question as to where their discussion and negotiation should take place, i.e., at the Committee on Disarmament itself or at the COPUOS, the latter being the forum at which the Treaty was originally negotiated. This is an issue of some significance because, as mentioned earlier in Part I, it has been broached on more than one occasion in respect of other instruments which the CD and its *Ad Hoc* PAROS Committee are considering. In the case of the Outer Space Treaty, however, the Italian memorandum of 1979 favoured the choice of the CD for the negotiation of the *Additional Protocol* to the Outer Space Treaty for two reasons:[16] first, that the subject concerned international security and, second, that it dealt with both the danger of an arms race in outer space and the use of satellites for the verification of arms limitation and disarmament agreements. However, the reinforcement of the Outer Space Treaty remains a controversial issue as other delegations maintain that any change to an instrument negotiated at the COPOUS should not be undertaken at a disarmament forum such as the CD.

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[13] See CD/471, *Op. cit.*, pp. 24-25. However, the Peruvian proposal suggests a mix of a multilateral or international approach and NTMs of verification available to each State Party (see CD/939, *Op. cit.*, p. 2).

[14] "Statement submitted by Peru to the *Conference on Disarmament*," CD/PV 428, 6 August 1987, p. 19.

[15] The Soviet view was that the Venezuelan proposal required further expert study on the grounds that the approach was an "...outwardly relatively uncomplicated way of filling a gap in the arrangements for preventing the intrusion of weapons into space". See a Soviet statement in the *Ad Hoc* PAROS Committee quoted in "Letter dated 21 March 1989 from the Permanent Representative of the Mongolian Peoples' Republic Addressed to the Secretary-General of the Conference on Disarmament Transmitting a Working Paper Entitled 'Review of Proposals and Initiatives of the States Members of the Conference on Disarmament under Agenda Item 5, Prevention of an Arms Race in Outer Space'," CD/905, 21 March 1989. p. 4.

[16] CD/9, *Op. cit.*, p. 3.

B. Anti-Ballistic Missile Treaty

Among the CD delegations which, though not party to the Anti-Ballistic Missile Treaty, have nevertheless suggested that its limitations should be widened, is that of Pakistan which presented a document in the mid-1980's in response to the concern then being expressed about ASAT weapons, BMD systems, early-warning or space-tracking radar, and surface-to-air missiles used in ABM mode. Developments in these areas were seen as a possible erosion of the commitments undertaken by the Soviet Union and the United States under the ABM Treaty and ABM-related instruments as well as the Outer Space Treaty itself.[17] Pakistan's view was that it was in the international community's interest to amplify and complement the existing régime on outer space. Therefore, to amplify it, Pakistan sought to multilateralize the ABM Treaty and called on both the CD and the *Ad Hoc* PAROS Committee to embark on early negotiations to prepare a comprehensive international agreement or agreements. To complement the régime, Pakistan sustained multilateral negotiations which would include, presumably, limitations on anticipated technological developments in space capable weaponry.

In addition to a number of confidence-building measures, the Pakistan document also proposed that an addendum to the ABM Treaty be adopted as an interim measure, pending the conclusion of a fully comprehensive PAROS Treaty.[18] The principal objective here was to ensure that there would be strict observance on the part of both the Soviet Union and the United States in respect of Article 5 of the ABM Treaty, under which both had undertaken not to develop, test, or deploy mobile ABM systems or components of such systems that are land-based, sea-based, air-based, and space-based. Furthermore, the Pakistan document proposed that a clear interpretation of certain activities permissible under the ABM Treaty should be provided so as to enable ambiguous phrases related to the Treaty, such as *other physical principles*, to be defined. Another feature was a call to "other technologically-advanced States" not to extend their own research beyond the limits observed by the two signatories to the ABM Treaty and by the interpretation to be provided in the new multilateral instrument defining ambiguous terms in the Treaty. Yet another interesting feature of the Pakistan proposal was the suggested inclusion of a mechanism to halt activities not in compliance with the Treaty.

A number of CD delegations reacted favourably to the main points of the Pakistan proposal, although many of the comments were in fact rather general in nature. For example, they tended to support the prohibition of both ground and/or space-based ABM weapons.[19] However, a few countries, such as Indonesia, went further, stating that the prohibitions of the ABM Treaty should be extended to ASAT weapons.[20]

On the question of negotiating an additional protocol to the Treaty, the Peruvian delegation argued that if the Treaty were to be multilateralized, its obligations should be comprehensive and free of all ambiguity. Peru also reinforced Pakistan's proposal with the suggestion that "...guidelines or parameters which allow for the regulation of

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[17] CD/708 (Pakistan), *Op. cit.*

[18] *Ibid.*, p. 2; see also "Statement submitted by Pakistan to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 367, 3 July 1986, p. 13.

[19] See, for example, CD/PV 428, *Op. cit*, p. 19-20 (Peru); CD/PV 472, *Op. cit.*, p. 7 (Peru).

[20] "Statement submitted by Indonesia to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 437, 4 February 1988, p. 6.

advanced technology" should be set up.[21] Thus, this was an attempt to distinguish between what should and should not be prohibited - and, equally important, how. Peru proposed the adoption of contractual limitations on the development of certain advanced technologies for hostile purposes which could have a destabilizing effect on the *status quo*.[22] However, as its delegation pointed out, such limitations should only be considered if the non-proliferation régime or another model capable of impeding or discouraging technological progress is not adopted.

To date, none of these proposals has led to any kind of amendment to the Treaty's present bilateral character because, over and above the negotiation of supplementary provisions or an additional instrument, the multilateralization of such an agreement is exceedingly complex. In addition, neither the United States nor the Soviet Union have formally supported the idea of multilateralization of the ABM Treaty. Accordingly, an alternative has been discussed at the CD whereby the initiatives proposed in respect of the ABM would be incorporated into a new more-comprehensive agreement on ASAT weapons. This would be negotiated at the CD, and will be referred to later in this guide.

C. Registration Convention

In general, the proposals to reinforce the Registration Convention are centred on provisions of Article 4. One of the most exhaustive tabled in this regard was submitted by Argentina in 1990.[23] This grouped several of the issues raised in the past and expressed a widely shared opinion regarding current limitations on the information to be supplied by launching States. These include the *timing* obligation in respect of the reports to be made of objects launched into space and the *actual contents* of such reports (including reports on the *general function* of space objects). Argentina proposed that reporting should be based on technically feasible and politically acceptable time-limits rather than on the present requirement that States should report the launching of objects into space *as soon as practicable*. This proposal is designed to avoid the situation where a report is made months after a space object has been launched or even not made at all. A more radical stand, advocated by the Netherlands and Pakistan, proposed that information be furnished on the *precise function* of the space object concerned before its actual launching.[24] These diverse positions have led to some controversy with the result that no consensus has yet been reached.

The Argentinian initiative also proposed that the type of information to be provided to the UN Secretary-General by launching States should move away from a minimalist formulation and give more details on the specification and classification of the space objects concerned in order to obtain a clearer distinction between the military and the non-military uses of space objects. Indeed, for some delegations the identification of military space systems which could have particularly destabilizing characteristics is *essential* and reinforces the idea of developing a reliable data base on the functions of

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[21] CD/PV 428, *Op. cit.*, p. 20.
[22] *Ibid.*, p. 20.
[23] CD/PV 566, *Op. cit.*, pp. 10-13.
[24] CD/PV 481, *Op. cit.*, p. 17 (Netherlands); CD/PV 498, *Op. cit.*, p. 9 (Netherlands); CD/PV 460, *Op. cit.*, pp. 13-15 (Pakistan).

satellites launched into space in as far as, say, military reconnaissance or telecommunication satellites are concerned.[25] In this connection, it is of interest that France has also proposed that, whenever a space object is registered, additional information should be supplied by launcher States, and that "...this broadening of the scope of the register should be effected on a voluntary, negotiated basis among the States parties."[26] The register should therefore include the following information:

- The orbital characteristics of each satellite;
- Details of its manoeuvrability;
- Information on energy sources available on board;
- Functional data relating to the on-board equipment;
- Certain other functional characteristics (mass, size, expected life of the space vehicle.[27]

France has also indicated that further broadening of the register could include the possibility of informing the United Nations Secretary-General of launch forecasts. However, other proposals more directly related to the placing of weapons in outer space were made by the Federal Republic of Germany, which proposed the addition of information on (a) authority responsible for launch and for control, and (b) presence or absence of weapons on board.[28]

Lastly, the Argentinian proposal expressed support for the creation of a group of experts to define a common criteria of the information to be supplied in respect to Article 4 of the Registration Convention.[29] However, the Argentinian proposal has encountered further controversy concerning changes to the Registration Convention as it stipulates that any such group of experts should be set up under the auspices of the CD and the *Ad Hoc* PAROS Committee.

One other amendment to the Registration Convention which has often been suggested is that clauses should be inserted enabling the reported information to be verified. Here, delegations have adopted rather more clear-cut positions than has been the case for other suggested improvements to the structure and/or content of the Convention. For instance, Argentina believes that the nature of the objects to be placed in space could be verified at the actual launching sites.[30] This has been claimed to be a practical measure, in particular because the number of launch-capable States and sites is relatively limited. Support for this proposition, in principle, has been expressed at the CD, particularly by the Netherlands and Pakistan. Pakistan has even taken the idea a little further in proposing that an international agency undertake this work at the launch site itself.[31]

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[25] For many delegations, this measure is also expected to provide a positive spin-off effect for the immunity of satellites as well.

[26] "Prevention of an Arms Race in Space: Confidence-Building Measures and Transparency," Working Paper submitted by France to the Conference on Disarmament," *Conference on Disarmament*, CD/1092, 1 August 1991, p. 3.

[27] *Loc. cit.*; CD/937, *Op. cit.*, p. 7.

[28] CD/1092, *Op. cit.*, p. 3 (France). This German proposal has reportedly been made in the *Ad Hoc* PAROS committee on 17 July 1990.

[29] CD/PV 566, *Op. cit.*, p. 12. See also a statement by India on this matter, CD/PV 423, *Op. cit.*, p. 12.

[30] CD/PV 423, *Op. cit.*, p. 7.

[31] The Soviet Union has proposed the creation of such an agency, see *infra*, Part II, Chapter IV, B, 1.

Other countries which have discussed the strengthening of the Registration Convention in some detail are Australia and Canada.[32] However, the approach taken in their joint papers has differed somewhat from the statements and proposals made by other delegations. It perceives a need to define legitimate space activities, including any activity in or directed towards outer space and which may or may not include weapon deployments. What is actually proposed by Australia and Canada is "...the strengthening of the application of the Convention for arms control purposes".[33] Thus, Canada has suggested that transparency in space activities could be improved by exchanging data on space objects which have military functions, or support military operations, function on behalf of military organizations. *Transparency* is to be undertaken multilaterally as laid down in the Registration Convention, via the good offices of the UN Secretary-General, who already receives information on the general functions of space objects reported in national registries. Moreover, the Canadian proposal suggests that the required information should be reported in a more specific and timely manner than is the case at present and should include the type of mission involved: civilian, military, or both.[34] The Canadian paper also suggests a way of surmounting the obstacle presented by the reporting of space objects by non-member States of the Registration Convention. Indeed, it proposes that space powers which are not party to the Registration Convention could also contribute to the strengthening of international security by providing the same type of information in pursuance of General Assembly resolution 1721 (XVI) of 1961[35] which, in similar vein, calls on States to furnish information on their space objects.

All of these proposals reflect the positions of delegations which sustain the viability of the Registration Convention as an instrument via which some military space activities may be governed. In addition, these proposals also reveal that for some countries - as India has pointed out[36] - the Convention's present form is not a useful data base for a disarmament agreement and that, in consequence, the Convention could and should be improved.

However, this view is not shared unanimously. Some delegations have expressed reservations on the implications that changes to the Registration Convention could have, while others have gone even further and questioned whether changes are in fact needed and indeed even the role of this instrument as an arms limitation agreement. For example, Japan has called for a comprehensive study to see whether the suggested changes to the Convention would lead to concrete and pragmatic measures of arms control and disarmament.[37] Central to this reasoning is the problem of the acceptability of the obligation to report military information and verification.[38] A clearer contrast is to be seen between the positions of the United States and most of the CD delegations. As stated in 1988, the Registration Convention is, for the United States, working

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[32] See, for example, CD/PV 468, *Op.cit.*, pp. 2-5 (Canada).

[33] See *Loc. cit.*, p. 4 for a Canadian statement in this connection.

[34] *Loc.cit.*

[35] A/1721, *Op. cit.*,

[36] Quoted in CD/905, *Op. cit.*, p. 24 (Mongolia).

[37] "Statement submitted by Japan to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 419, 7 July 1987, p. 12.

[38] This concern is somewhat counter-argued by those who support the strengthening of the Convention. For example, Argentina has stated that "...there is no reason why a more detailed description should affect the confidential nature of a mission or its effectiveness if there is an appropriate definition of what criteria constitute a complete and satisfactory general description of the functions of a space object". See CD/PV 566, *Op. cit.*, p. 12.

effectively.[39] The United States also recalled that the General Assembly's review of the Convention in 1986 had concluded that no revisions were necessary. Furthermore, the argument has been raised by the US that, originally, the Registration Convention was neither an arms control nor a confidence-building instrument, but a legal instrument establishing an international registry of space objects for the purpose of giving practical effect to the 1972 Liability Convention. The United States accordingly considered that any change to the Registration Convention should be made within the framework of the COPUOS and not the *Ad Hoc* PAROS Committee, on the grounds that the latter is a subsidiary body of the CD dealing primarily with security matters and not the peaceful uses of outer space.

As reported to the *Ad Hoc* PAROS Committee, the position of the Soviet Union is to some extent supportive of the view expressed by the United States, in particular the fact that the Registration Convention was negotiated in the COPUOS and that this Committee remains the appropriate forum to discuss any amendment to the Convention.[40] One other example which demonstrates the lack of consensus in the CD may be seen from a French working paper, submitted in July 1989, which dealt, *inter alia*, with the immunity of satellites. At that time, France had not yet determined its position on the appropriate international legal framework for the improvement of the Registration Convention and it questioned if the need was for a revision of the Convention, the adoption of an entirely new text, or simply the adoption of a resolution by the United Nations General Assembly.[41]

[39] See discussion and citation in CD/905, *Op. cit.*, pp. 24 (Mongolia).
[40] *Ibid.*, p. 25.
[41] CD/937, *Op. cit.*, p. 8; also see CD/PV 518, *Op. cit.*, p. 7.

CHAPTER II: PROPOSALS FOR A NEW AGREEMENT

Another important area of the CD's activity is the examination of various proposals for new treaties or agreements. Some of these have been concerned with such fundamental issues as the *non-use of force in outer space*. Others have concentrated on weapon-specific subjects including a possible ban on ASAT weapons, a question which is now being accorded increasing attention on the part of delegations. Accordingly, the fact that the USSR and the USA have accepted in bilateral agreements that certain types of space-based objects, and their ground-based segments, should be legally protected has been welcomed as a significant development (despite its limitations), because of the threat that ASAT weapons could represent for satellites utilized for peaceful purposes. Hence, a number of proposals have been tabled on the immunity of satellites.

A. Prohibition of the Stationing of Weapons of Any Kind in Outer Space

Among the proposals put forward under this heading is a draft treaty which the Soviet Union presented first to the United Nations General Assembly in 1981 and secondly to the Committee on Disarmament in 1982.[1] The main features of this proposal were contained in the first four articles being concerned with (1) a ban on certain space activities and (2) the means of compliance with such a ban. While some of these articles reiterated general themes proposed in the late 1970s by other delegations - for example, the Italian Additional Protocol proposal discussed earlier in this Guide,[2] others introduced a completely new type of prohibition on the use of arms in outer space.

For example, Article 1, paragraph 1, drew heavily on the Italian proposal by calling on States Parties to undertake "... not to place in orbit around the earth objects carrying weapons of any kind, install such weapons on celestial bodies, or station such weapons in outer space in any manner."[3] In addition, paragraph 1 extended these undertakings to include the placement of weapons on "reusable manned space vehicles" in existence at the time of the ratification of the treaty or subsequently developed by the contracting parties.[4] The second paragraph of Article 1 also established obligations for each State Party not to assist, encourage or induce any State, group of States or international organizations to engage in such undertakings.

Article 2 was very similar to Article 3 of the Outer Space Treaty. In essence, both stipulate that space objects shall be used in accordance with international law and the Charter of the United Nations. However, Article 3 of the Soviet Draft introduced a new international norm by making non-interference with space objects obligatory, which

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[1] "Letter Dated 10 August 1981 from the Minister for Foreign Affairs of the Union of Soviet Socialist Republics Addressed to the Secretary-General", *Official Records of the General Assembly*, A/36/192, 20 August 1981; "Letter Dated 6 April 1982 from the Representative of the Union of Soviet Socialist Republics Addressed to the Chairman of the Committee on Disarmament Transmitting the Draft Treaty on the Prohibition of the Stationing of Weapons of Any Kind in Outer Space Submitted to the Thirty-sixth Session of the General Assembly", *Committee on Disarmament*, CD/274, 7 April 1982.

[2] See *supra*, Part II, Chapter I, A.

[3] CD/274, *Op. cit.*, p. 2.

[4] This provision was seemingly included to cover technological developments such as the US "shuttle" type of reusable vehicles. For statements expressing concern about the use of the US space shuttle for military reconnaissance and other military activities, see, *inter alia*, "Statement submitted by Mongolia to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 170, 8 April 1982, pp. 14-15.

would include, presumably, attack by dedicated or non-dedicated ASAT weapons. Article 3 also called on States Parties not to destroy, damage, disturb the normal functioning of, or change the flight trajectory of space objects of other States Parties.[5] The provisions of Article 3 were thus apparently intended to make good the shortcoming in Article 4 of the Outer Space Treaty which, as explained above in Part I, does not specifically mention that outer space shall be used "exclusively for peaceful purposes."[6]

In contrast to various other proposals presented in multilateral disarmament fora which envisaged some kind of international technical means of verification, Article 4 of the Soviet Draft confined the compliance provisions to the use of NTM verification. In addition, this Article contained non-interference obligations with such means of verification. Moreover, the Soviet Draft proposed consultations between States Parties in the event of a suspected breach while the Italian initiative, for example, had ensured that the United Nations would play an active role via the lodging of complaints with the Security Council and the carrying out of investigations by that organ (Article III).

As well as the support it received at the First Committee and the plenary meetings of the United Nations General Assembly, the Soviet Draft was well received at the CD by a number of delegations belonging to what was then known as the Group of Socialist countries,[7] mostly on the grounds that the proposal addressed not only the prevention of an arms race in outer space in general but also the priority question of ASAT weapons in particular.

It was precisely this ASAT weapons aspect which provoked the criticism of several delegations belonging to the Group of Western countries and, to a lesser degree, some delegations in the Group of 21.[8] The debates on this Draft Treaty revealed serious problems of interpretation, with The Netherlands delegation drawing attention to the fact that the wording of the text seemed "...to allow for dangerous and inadmissible *a contrario* arguments that could undermine provisions of the draft and indeed those of treaties already in force."[9] For example, The Netherlands (and other countries such as France and the Federal Republic of Germany) argued that Article 3 could be interpreted as allowing a State Party to intercept the space objects of other contracting State Parties if they were not operated in accordance with the provisions stipulated in paragraph 2, Article 1, of the Draft.[10] The situation was described as being exacerbated by "...the absence of firm criteria and of any objective determination of prerequisites..." for what

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[5] Provided that the object in question had been placed in orbit in strict accordance with Article 1, paragraph 1, of the Draft Treaty, i.e., that the space object is not or does not contain a weapon of any kind.

[6] *Supra*, Part I, Chapter II, A, 2; for a discussion on Article 4 of the Outer Space Treaty, see CD/618, *Op. cit.*, p. 12 (Canada).

[7] See "Statement submitted by Mongolia to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 251, 2 March 1984, pp. 7-8; CD/272, *Op. cit.* (Mongolia); CD/PV 170, *Op. cit.*, pp. 14-16 (Mongolia); "Statement submitted by Czechoslovakia to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 173, 21 April 1982, p. 22; "Statement submitted by Bulgaria to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 183, 31 August 1982, p. 12; "Statement submitted by the German Democratic Republic to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 183, 31 August 1982, p. 22; "Statement submitted by Hungary to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 184, 2 September 1982, pp. 23-6; "Statement submitted by Hungary to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 203, 15 March 1983, p. 11.

[8] See, for example, "Statement submitted by the Netherlands to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 170, 8 April 1982, p. 12; "Statement submitted by the Federal Republic of Germany to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 171, 15 April 1982, p. 11; "Statement submitted by France to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 172, 17 April 1982, pp. 17-18. For a Swedish statement, see CD/PV 252, *Op. cit.*, p. 19.

[9] CD/PV 170, *Op. cit.*, p. 12.

[10] CD/PV 170, *Op. cit.*, p. 12; CD/PV 171, *Op. cit.*, pp. 10-11 (FRG); CD/PV 172, *Op. cit.*, pp. 17-18 and CD/375, *Op. cit.*, p. 5 (France).

Western delegations considered to be a "self-appointed space police" role.[11] In this context, one delegation stated that the Soviet proposal "...would seem to pave the way for misuse and serve, rather, as an incentive for the development and testing of additional anti-satellite systems."[12] The point was also made that, since the prohibitions in the proposal applied only to the space objects of the Parties to the Treaty, the development, testing and/or production of "objects carrying weapons of any kind", and/or their use under certain circumstances, were not forbidden.[13] This was considered a particularly important point, especially in the absence of a clear definition of the word "weapon", and in this connection the Swedish delegation was also critical of the fact that the text failed to cover ASAT systems as they were conceived at the time.[14]

Yet another criticism was the fact that provision had only been made for NTMs of verification.[15] Article 4 was thought to reflect legitimate method of verification for certain USSR/US bilateral agreements which did not necessarily mean that its application would be either adequate or acceptable in a multilateral context,[16] especially as it also failed to leave open the possibility of creating an independent investigating authority or any other international means of verification.

Lastly, the French delegation expressed reservations on the extension of the prohibitions to space objects whose trajectory was not exclusively orbital (specific reference having been made to reusable vehicles, which would have included shuttle type spacecraft).[17] In the French view, it would have been more appropriate to have provisions to resolve problems which "...may arise from dual use - both civilian and military purposes - of orbital platforms."[18]

In the meantime, no revised version of the Soviet Draft Treaty has been presented. Nevertheless, some of the principles presented in that initiative were included in other proposals tabled by the Soviet Union in the early 1980s, notably those dealing with the use of force in outer space.

B. Prohibition of the Use of Force in Outer Space and from Space against the Earth

In 1983, the Soviet Union tabled another motion on outer space at both the United Nations General Assembly and the CD.[19] This proposed that the use or threat of use of force in outer space, the atmosphere, and on the Earth be prohibited. Article 1 dealt with the utilization, as instruments of destruction, of space objects in orbit around the Earth, on celestial bodies, or stationed in space, while Article 2 prohibited the testing or deployment (by placing in orbit around the Earth or stationing on celestial bodies) of

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[11] See, for example, CD/PV 171, *Op. cit.*, p. 10-11 (FRG); CD/375, *Op. cit.*, p. 5 (France).
[12] CD/PV 171, *Op. cit.*, p. 11 (FRG).
[13] CD/PV 170, *Op. cit.*, p. 12 (Netherlands).
[14] CD/PV 252, *Op. cit.*, p. 19 (Sweden).
[15] CD/PV 170, *Op. cit.*, p. 12 (Netherlands); CD/PV 171, *Op. cit.*, pp. 10-11 (FRG); CD/PV 172, *Op. cit.*, pp. 17-18 (France).
[16] CD/PV 170, *Op. cit.*, p. 12 (Netherlands).
[17] CD/PV 172, *Op. cit.*, pp. 17-18.
[18] *Loc. cit.*
[19] "Letter Dated 19 August 1983 from the First Vice-Chairman of the Council of Ministers of the Soviet Socialist Republics, Minister of Foreign Affairs of the USSR", *Official Records of the General Assembly*, A/38/194, 23 August 1983; "Letter Dated 20 March 1984 Addressed to the President of the Conference on Disarmament from the Representative of the Union of Soviet Socialist Republics, Transmitting the Text of a Draft Treaty on the Prohibition of the Use of Force in Outer Space and from Space Against the Earth", *Conference on Disarmament*, CD/476, 20 March 1984.

space-based weapons capable of destroying objects on the Earth, in the atmosphere, or in outer space. Article 2 also provided for the non-interference with space objects of other Parties, either by destroying, damaging, or disturbing the normal functioning, or changing the flight trajectory, of such objects (Article 2, paragraph 3).

The Soviet proposal had the merit of having taken into account some of the criticisms voiced by Western Group countries when the Soviet Draft Treaty had been presented in 1981.[20] Article 2, paragraph 5, for example, was probably an attempt to accommodate the French position stressing prohibition on the testing or use of manned spacecraft for military purposes rather than references to the use of reusable vehicles. This new proposal also introduced an obligation on State Parties not to "test or create" new ASAT systems and another to destroy any such systems they might already possess - which was probably in response to the Swedish criticism regarding existing ASAT capability.[21] Moreover, although the Soviet proposal of 1983 maintained NTMs of verification as the principal method of ensuring compliance, there was also provision for States to have "...recourse to appropriate international procedures within the United Nations and in accordance with its Charter...", including recourse to a Consultative Committee of State Parties to the Treaty (Article 5).

In general, this draft proposal was more favourably received than its predecessor in 1981 by all different Groups in the CD. Additionally, the former Group of Socialist countries supported other USSR initiatives such as the declaration of a unilateral moratorium on ASAT launchings and its declared readiness to conduct separate negotiations on ASAT systems with the United States.[22] Several delegations in the Group of 21 and even the Western Group considered the Soviet proposal as an improved and constructive effort to the work of the CD,[23] although some reservations were expressed regarding the verification measures.[24]

However, there was a lack of support on the part of the United Kingdom and the United States,[25] the latter noting that certain clauses of the proposal had already been dealt with in the existing legal régime, one example being the ban on the use of force (save as self-defence in the event of an armed attack) which constituted the main prohibition of the new Draft Treaty. In the view of the United States delegation, such a Treaty would undercut "... a significant portion of contemporary international law."[26]

C. Prohibition of ASAT Weapons and the Immunity of Space Devices

The legal protection of satellites and other space objects is a complex issue not only because of the varied nature of present and envisaged ASAT methods, but also

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[20] For a Soviet description of the main characteristics of the 1983 proposal, see CD/PV 252, *Op. cit.*, pp. 9-11.

[21] See discussion in CD/PV 252, *Op. cit.*, p. 20 (Sweden).

[22] CD/PV 253, *Op. cit.*, p. 9 (Czechoslovakia); "Statement submitted by Yugoslavia to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 254, 29 March 1984, p. 36.

[23] See statements in CD/PV 252, *Op. cit.*, p. 20 (Sweden); CD/PV 253, *Op. cit.*, p. 9 (Czechoslovakia); "Statement submitted by Italy to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 253, 27 March 1984, p. 17; CD/PV 254, *Op. cit.*, p. 11-12 (Sri Lanka); CD/PV 254, *Op. cit.*, p. 36; "Statement submitted by Poland to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 255, 3 April 1984, p. 15.

[24] CD/PV 253, *Op. cit.*, p. 17 (Italy).

[25] See statements by the United Kingdom - 28 July 1987 - and the United States - 30 June 1987 - to the *Ad Hoc* PAROS Committee, quoted in CD/905, *Op. cit.*, p. 7 (Mongolia).

[26] CD/905, *Op. cit.*, p. 7 (Mongolia).

because space objects can be used either for military activities in outer space or for other activities such as the maintenance of international security. Efforts at the CD are usually centred around two main themes: the limitation, banning, and destruction of actual ASAT weapons, and the immunity of artificial earth satellites.[27] In the first case, several delegations have spoken in favour of a treaty banning ASAT weapon systems, and Soviet initiatives on the subject, for example, have included a proposal to halt the development of ASAT weapons, disarmament in regard to existing systems, and a prohibition on the introduction of any new weapon systems in outer space.[28] Some delegations wholeheartedly endorsed these Soviet initiatives, but others, while supporting their content and principles in general, nevertheless expressed concern about other areas. In 1987 a supporting stand was taken by the then German Democratic Republic, and the Mongolian and Polish delegations.[29] Sweden, on the other hand, fell into the latter category. As its delegation has reiterated on many occasions over the past 5-6 years, Sweden favours a ban on all space weapons, including any deployed on the ground or air-launched which could be directed against targets in space - in other words, any treaty on ASAT weapons should cover their development, testing and deployment, and use on earth, in the atmosphere and in outer space ***and*** their destruction.[30] Moreover, Sweden has also made its views known on such other ABM technology-related issues as the drawing of a meaningful distinction between dedicated ASAT systems and systems with an incidental or potential ASAT capability. Thus, Sweden supports and encourages negotiation at the *Ad Hoc* Committee to avert both vertical and horizontal arms proliferation[31] in outer space via a ban on dedicated ASAT weapons and ASAT-mode testing of various non-dedicated systems.[32]

Another proposal came from the Indian delegation to the effect that the *de facto* moratorium observed by the USSR and the US on the development of dedicated ASAT weapons should be taken a step further[33] by the creation of a multilateral agreement which would convert this moratorium into a universally binding commitment covering both the dismantling of existing systems and the production of new ones. Similarly to Sweden, India has proposed that the testing of non-dedicated ASAT systems should also

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[27] The establishment of legal norms conferring immunity on satellites is generally thought to be more appropriate, practical and politically desirable than their *passive* or *active* physical protection. *Passive protection* through the hardening of satellite structures or the introduction of protective shields would not solve the problem of the satellites already in Earth orbit, nor would it be a financially or technically practical measure. *Active protection* by means of on-board defensive weapon systems would both institutionalize the introduction of weapons into outer space and make the task of identifying defensive/offensive space devices virtually impossible. For reference, see CD/937, *Op. cit.*, p. 6 (France).

[28] See "Statement submitted by the Union of Socialist Soviet Republics to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 486, 14 February 1989, p. 17.

[29] See CD/402, *Op. cit.*, p. 10 (Poland).

[30] CD/PV 516, *Op. cit.*, p. 18; "Statement submitted by Sweden to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 484, 7 February 1989, p. 15; see also a Swedish proposal submitted to the *Ad Hoc* PAROS Committee in August 1985.

[31] As used here, "vertical" proliferation means a quantitative increase of arms in the arsenal of a given country while "horizontal" proliferation is an increase in the number of countries possessing a given type of arm or arm capability.

[32] See "Letter Dated 15 February 1988 Addressed to the President of the Conference on Disarmament by the Permanent Representatives of Argentina, India, Mexico, and Sweden Transmitting a Document Entitled the 'Stockholm Declaration' Adopted in Stockholm on 21 January 1988 by the Five Heads of States or Government of Argentina, Greece, India, Mexico, and Sweden and the First President of Tanzania", submitted to the *Conference on Disarmament*, CD/807, 19 February 1988.

[33] CD/PV 486, *Op. cit.*, p. 6 (India); "Statement submitted by Sweden to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 484, 7 February 1989, pp. 15-17; "Statement submitted by Yugoslavia to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 489, 23 February 1989, p. 11; CD/PV 516, *Op. cit.*, p. 19 (Sweden); CD/PV 529, *Op. cit.*, p. 9 (India); "Statement submitted by India to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 548, 3 April 1990, p. 17.

be prohibited in order to close the gap in the present bilateral USSR-US ABM Treaty, which restricts the testing of weapons in the ABM mode but not those in the ASAT mode.

One of the most controversial questions still to be resolved at the CD is the way an agreement on the elimination of all means of direct threat to space objects should be structured. One suggestion put forward by France was that there should be a selective approach banning high-orbit ASAT systems and prohibiting, for a renewable period of five years, the development and testing (on the ground, in the atmosphere or in space) of ABM and ASAT-capable beam-weapon systems.[34] The French proposal would also include weapons capable of destroying ballistic missiles or satellites at great distances. The idea of a ban on high-altitude ASAT systems received some support particularly from States which felt that the proposal had the merit of not calling for an all-out ban on ASAT systems as a primary objective of the negotiations, since this would probably involve a ban on BMD which might not be so easily accepted.[35]

Another proposal, made by the delegation of Sri Lanka, suggested that ASAT weapons, including dedicated and auxiliary ASAT systems, should be classified into low-altitude and high-altitude groups.[36] India, on the other hand, favoured the more-detailed structure of a treaty divided into two parts,[37] one containing a general formulation of ASAT prohibitions and the other protocols for different categories of satellites. It was suggested that the protocols should have three major categories in line with the satellites' orbital planes: Near-Earth Orbit (NEO), Higher-Earth Orbit (HEO), and Geosynchronous Orbit (GEO).[38]

However, the most comprehensive proposal placed before the CD was not of a selective nature but combined a ban on ASAT weapons with immunity for artificial earth satellites.[39] This proposal, authored by the delegations of the German Democratic Republic and the Mongolian People's Republic, was largely based on existing instruments such as the United Nations Charter and the Outer Space Treaty and prohibited resort to the use or threat of the use of force against space objects of any kind and the interference in any manner with other objects in space. Arms limitation and disarmament measures in respect of dedicated ASAT weapons, a ban on non-dedicated ASAT weapon activity, and a call to State Parties not to conduct or sustain any action linked with ASAT activities were also envisaged.

The GDR/Mongolian proposal also contained a new element, that of verification. This was to be left to each State Party, with the stipulation that State Parties possessing NTMs should make available any information they obtained via such means to either an organ set up under the agreement or to other State Parties.[40] It was also proposed that the agreement should establish a Consultative Committee and an International

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[34] CD/PV 263, *Op. cit.*, p. 22; see also a Chinese statement to the same effect in CD/PV 423, *Op. cit.*, p. 18.

[35] "Statement submitted by Sri Lanka to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 325, 30 July 1985, p. 12; see also "Statement submitted by the Netherlands to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 418, 2 July 1987, p. 9.

[36] CD/PV 325, *Op. cit.*, p. 12.

[37] CD/PV 423, *Op. cit.*, p. 11.

[38] *Ibid.* Also see a discussion in Donald Hafner and Bhupendra Jasani, "An Arms Control Proposal Limiting High-Altitude ASAT Weapons," *Strategic Defences and The Future of The Arms Race*, A Pugwash Symposium, John Holdren and Joseph Rotblat (eds.), Macmillian Press: Houndmills, 1986, pp. 226-39.

[39] CD/777, *Op. cit.* (GDR/Mongolia).

[40] CD/777, *Op. cit.*, p. 2.

Inspectorate, the latter being responsible, *inter alia*, for stringent *in loco* inspections. Each State Party would be able to request an inspection at any time and the State subject to the request would be "...obliged to provide satisfaction, as early as possible but not later than 10 days after the receipt of such request" or, in exceptional circumstances, satisfy this request with an alternative arrangement.[41] Another important innovation in this proposal was that there should be an exchange of information on State Parties' launch parameters and the general functions of their space objects.

While this joint GDR/Mongolian proposal reflected the thinking of most of the delegations belonging to the former Group of Socialist States, members of the Group of Western countries were critical of at least three of its main provisions. For example, the Soviet Union supported the idea that the CD should be charged to "...study the possibility of eliminating existing anti-satellite systems" and the banning of space-to-space, space-to-Earth, and Earth-to-space weapon systems,[42] but the United States' reaction was very reserved:

> Such proposals raise a host of problems. A key problem concerns the verification of compliance with such an agreement. We do not believe that verification schemes proposed to date are adequate to this purpose. Another problem with a comprehensive ASAT ban concerns the legal issue of how anti-satellite weapons are to be defined and categorized. In addition to systems that a State would choose to identify as an anti-satellite weapon, there are many different types of weapon systems that could be used to destroy, damage or disable satellites.[43]

The fact that there are many problems attaching to the conception of a comprehensive agreement banning or limiting ASAT weapons further emphasizes the need to protect space objects via an agreement on the legal immunity of such objects, an argument to which more and more delegations now appear to subscribe on the grounds that such an agreement would encourage and develop confidence among States and thereby facilitate progress of future bilateral and/or multilateral negotiations. Here again, however, it is how to reach agreement that remains the open question.

A proposed structure for an immunity regime has been put forward by the Federal Republic of Germany whose delegation suggested a dual approach[44] - i.e., a restriction on ASAT weapons hardware, to be negotiated between the Soviet Union and the United States, and negotiations proper on the legal immunity of satellites under the auspices of a multilateral forum. For the latter, the Federal Republic of Germany proposed two types of negotiations: one on the immunization of satellites and another on confidence-building measures. While the German proposal certainly helps to clarify the issue of immunity, other basic problems, such as, the definition, identification and classification of satellites still remain.

For ease of reference in this respect, Diagram B sets out the criteria that have been advanced at the CD for the establishment of a regime on the immunity of artificial

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41 *Ibid.*, p. 3.

42 "Statement submitted by the Union of Soviet Socialist Republics to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 385, 3 February 1987, p. 22.

43 Quoted in CD/905, *Op. cit.*, pp. 15-16 (Mongolia); see also a French statement on the non-verifiability of an absolute ban on ASAT systems in CD/PV 518, *Op. cit.*, pp. 5.

44 "Statement submitted by the Federal Republic of Germany to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 345, 6 March 1986, p. 9.

earth satellites. Broadly speaking, these fall into two groups: selective and comprehensive. Australia, France, Pakistan, and the Federal Republic of Germany[45] support the former since they believe that a distinction should be drawn between satellites which are subject to the law of war and those which are not.[46] Thus, in their view, immunity should be accorded to a certain agreed type of satellite whose definition would include a functional method, a geographical area of deployment method, a damage potential method, or a combination of all two or three of these. Australia, for instance, maintains that all satellites contributing to the preservation of strategic stability which could be instrumental in monitoring arms limitation and disarmament agreements (including their associated ground stations) should be protected from attack by the functional method.[47]

Another example of the selective approach is the damage potential method which is fundamental to the *principle of non-interference* as set forth in a working paper presented by the French delegation.[48] This argues that immunity should be based on the legal enforcement of non-interference with satellites and the establishment of rules to ensure compliance via (1) a specific and formal recognition of the principle of the non-use of force laid down in the UN Charter and (2) a multilateralization of the bilateral USSR/US agreements on the immunity of certain satellites. In other words, the French initiative is a re-affirmation of the principle of non-interference with satellites and the granting of legal immunity to satellites which have been identified under a specific criterion. While the *principle of non-interference* would be defined by *non-aggressive space activities*, the selection of satellites to be given immunity would be made by identifying the satellites which do not have the capacity to interfere actively with other satellites.[49] France has suggested that the discussion at the *Ad Hoc* PAROS Committee related to the *principle of non-interference* "...might focus, on the one hand, on the *technical parameters* to be used to determine a satellite's capability for active interference, and, on the other hand, on the possible *juridical formulation* of the principle of non-interference."[50]

The French working paper also proposed the introduction of *rules of the road* so that a *space code of conduct* might be set up to strengthen both the Registration Convention and the establishment of a trajectory centre to monitor the flight paths of satellites and their immediate environment.[51]

As in the case of the German proposal, the central themes and general guidelines expressed by the French delegation met with some support.[52] However, other States took a more stringent position about the way satellites should be classified. For example, some maintained that the military use of satellites should be completely excluded from

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[45] See, for example, "Statement submitted by Australia to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 279, 7 August 1984, 12; CD 375, *Op. cit.*, p. 5 (France); CD/905, *Op. cit.*, p. 10 (Mongolia).

[46] For a statement by the Federal Republic of Germany on this issue, see CD/905, *Op. cit.*, p. 10 (Mongolia).

[47] CD/PV 279, *Op. cit.*, p. 12 (Australia); "Statement submitted by Australia to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 374, 27 July 1986, pp. 16-17.

[48] CD/937, *Op. cit.*; see also CD/PV 518, *Op. cit.*, pp. 5-7.

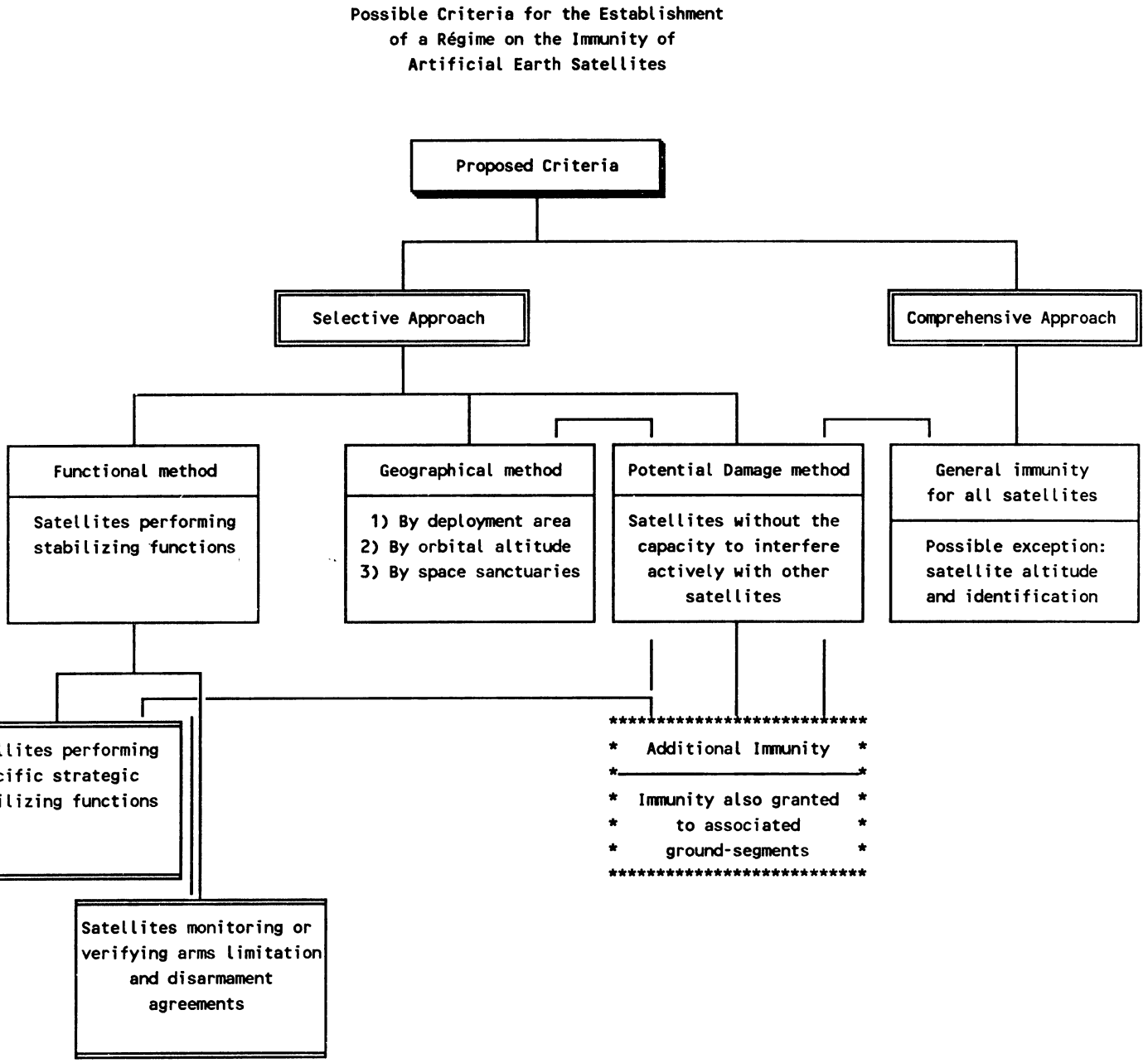
[49] *Loc. cit.*

[50] CD/1092, *Op. cit.*, p. 2 (emphasis on original).

[51] For a longer description of proposals on *rules of the rode*, *space code of conduct*, and the trajectory centre, see *infra*, Part II, Chapter III, B and C.

[52] See CD/PV 345, *Op. cit.*, 9-12 (FRG); "Statement submitted by the Union of Soviet Socialist Republics to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 511, 22 June 1989, pp. 7-8; "Statement submitted by the Federal Republic of Germany to the Conference on Disarmament, *Conference on Disarmament*, CD/PV 516, 11 July 1989, p. 7-8; CD/PV 529, *Op. cit.*, p. 10 (India); CD/941, *Op. cit.* (Poland); CD/375, *Op. cit.* (France).

DIAGRAM B


Possible Criteria for the Establishment
of a Régime on the Immunity of
Artificial Earth Satellites
Proposed Criteria
Selective Approach
Comprehensive Approach
Functional method
Satellites performing stabilizing functions
Geographical method
1) By deployment area
2) By orbital altitude
3) By space sanctuaries
Potential Damage method
Satellites without the capacity to interfere actively with other satellites
General immunity for all satellites
Possible exception: satellite altitude and identification
Satellites performing specific strategic stabilizing functions
Satellites monitoring or verifying arms limitation and disarmament agreements
Additional Immunity
Immunity also granted to associated ground-segments

any régime granting immunity to space objects. As far as the functional method is concerned, this means that immunity would be granted only to satellites performing definite peaceful functions within the framework of arms limitation and disarmament agreements. Early-warning, reconnaissance, and other satellites used for any military purpose would be excluded because they are seen as a threat to the security of other States.

Rather than the selective approach, some delegations prefer a comprehensive régime. This is true of the Soviet Union and Poland. Both favour an international agreement which would guarantee global immunity for Earth-orbiting satellites.[53] In this connection, Poland has particularly stressed that since artificial Earth-orbiting objects may be used for either civilian or military activity, it is difficult to discern one type from the other.

However, there still remains a major fundamental difference of opinion between States which favour an agreement on the immunity of satellites and those who oppose any such initiative, whether selective or comprehensive. For example, in expressing reservations about the purpose of an agreement on the immunity of satellites on the grounds that protection against the threat or use of force against satellites, save in the case of self-defense, already exists, the United States delegation has said:

> ...if these proposals mean to prohibit nations from taking actions against satellites in legitimate cases of self-defense, then they undermine the Outer Space Treaty, the United Nations Charter, and the inherent right of sovereign States to take adequate measures to protect themselves in the event of the threat or use of force.[54]

Besides the fundamental problem presented by the lack of agreement on the need for negotiating an agreement on the immunity of satellites, there is also a secondary problem related to a lack of consensus on the appropriate forum for negotiating such an agreement. At present, opinions are divided between the COPUOS and the CD itself. A compromise solution advanced by the Federal Republic of Germany suggests that the Legal Sub-Committee of the COPUOS should be responsible for enforcing the protection of civilian activities and the CD for the immunity of satellites concerned with military roles.[55] However, given the complexity and interrelationship of satellites and ASAT capabilities, many have asked whether such a proposal is desirable, let alone practical.

Whatever the final outcome of these discussions may be, it would seem that no concrete results can be reached in the absence of confidence in space activities. The following Chapter therefore analyzes the various confidence-building measures that have been proposed as well as some of the reactions to their possible application.

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53 CD/PV 385, *Op. cit.*, p. 22 (USSR); CD/PV 402, *Op. cit.*, p. 11 (Poland).
54 Quoted in CD/905, *Op. cit.*, p. 11 (Mongolia).
55 CD/PV 345, *Op. cit.*, p. 12.

CHAPTER III: PROPOSALS ON CONFIDENCE-BUILDING MEASURES (CBMs)

As used within the context of item 5 of the CD agenda, the term *confidence-building measures* denotes a set of measures whose aim is to establish confidence among States concerning their activities in or related to outer space. The purpose of these measures is to obtain greater *transparency* and *predictability* in space activities in general and in military and military-related activities in particular, thus developing multilateral experience in the maintenance of security in outer space.

The CD has received several proposals on various ways and means of promoting CBMs. Some of these proposals have simply outlined the framework within which various mechanisms could be conceived and developed. One such example is the *open outer space* concept which delegations are just (i.e., 1991) starting to consider in detail. On the other hand, there have also been more elaborate proposals suggesting a whole set of rules of behaviour related to activities in outer space, e.g., a *space code of conduct*. Yet another idea was to set up a specialized agency which could, say, collect data supplied by satellites on arms limitation and disarmament. Other similar proposals also foresee a significant role for the United Nations in the establishment of confidence-building among States.

Nevertheless, whatever their nature, confidence-building measures are considered to be viable means of preventing an arms race in outer space, especially by those who fear that the creation of a comprehensive agreement will still take some time to achieve.

Although proposals on confidence-building measures are not complex, reactions to them are usually expressed in rather general terms. Thus, instead of summarizing the different national standpoints, a descriptive approach has been adopted in this Chapter.

A. CBMs on a Voluntary/Reciprocal Basis

One suggestion is that agreement should be reached on certain documents which would not, initially, be intended to constitute a treaty. Any such agreement would take the form of non-mandatory provisions which States would observe in a spirit of reciprocity. This type of approach, it is argued, would demonstrate co-operative behaviour and contribute to mutual confidence. In a proposal of this kind Pakistan suggested that the CD "...should call upon the space powers to share information regarding their current and prospective activities in space and to indicate their understanding of and adherence to relevant treaty obligations".[1] In 1989 the Polish delegation submitted a even more elaborate proposal[2] whereby measures would be adopted by the CD itself, to which participating States would submit information leading to transparency in outer space activities. These measures, which were not intended to be

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[1] CD/708, *Op. cit.*, p. 2.

[2] "Letter Dated 1 August 1989 Addressed to the Secretary-General of the Conference on Disarmament by the Permanent Representative of the Polish People's Republic Transmitting a Working Paper entitled 'Confidence-building Measures Related to Item 5'," submitted by Poland to the *Conference on Disarmament*, CD/941, 1 August 1989; see also a discussion in "Statement submitted by Poland to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 571, 7 August 1990, pp. 18-21.

legal obligations, would be adopted in the Committee's report of work on item 5 of its agenda and include information on the following themes:[3]

■ Positive Law of Outer Space

- A reaffirmation of the importance of space law;
- A call on all States to act in conformity with space law;
- A call on all States not yet part of agreements related to outer space to consider their accession to such international instruments.
- A suggestion to all States Party to multilateral treaties and agreements related to outer space to accept the jurisdiction of the International Court of Justice in all disputes concerning interpretation and application of such instruments.

■ Transparency in Space Activities

- A suggestion that States consider to exchange information on a voluntary basis, of their following space activities:
  - activities having military or military-related functions;
  - prior notification of launching of space objects;
  - send observers to launching of space objects or to preparation of or participation in other outer space activities, particularly having military or military-related functions (in the spirit of reciprocity and goodwill);
  - supply other information considered useful for (a) building confidence and (b) the reduction of misunderstanding.

■ Destination of Information

- To other members of the Conference on Disarmament: through (a) usual diplomatic channels or (b) through the Secretary-General of the Conference on Disarmament;
- Open to all States.

The Polish proposal also stated that any exchange of information provided within the framework of these initiatives should not affect the obligations and practices of States as regards any other agreement on outer space, in particular, the Registration Convention. Further measures proposed by Poland suggested that members of the CD, particularly those with outer space capabilities, should agree to recognize that increased voluntary transparency would reduce misunderstanding among States. The example of the Polish proposal sustains the strategy of gradual achievement in arms limitation and disarmament, and this approach is pursued in the hope that such undertakings will facilitate the pursuit of other measures leading to mutual confidence in space activity.

France has announced to "...stand ready to give favourable consideration to a measure providing for *assessment visits* at launch site or orbital control site of a

[3] For the full document, see CD/941, *Op. cit.*, pp. 2-4.

registered space object."[4] However, the French delegation has made it clear that measures involving such visits should take place on a voluntary basis and that "...only States which had agreed to such an inspection could be visited."[5]

B. CBMs on a Contractual Obligation Basis

Confidence-building measures of this type have been the subject of several different proposals. For example, the delegation of Pakistan has expressed the view that such measures could include, *inter alia*:

- Negotiations to reach an interim or partial agreement in view of an international treaty to supplement the ABM Treaty;
- A moratorium on the development, testing and deployment of ASAT weapons;
- Immunity for space objects.[6]

To these could probably be added the creation of an international space agency and/or an international trajectography centre.

However, the philosophy behind this type of measure is quite different from that advocated in the Polish proposal in that the objective here is to institutionalize the mechanisms. They would therefore not be voluntary or reciprocal, but would have a legally binding character.

1. *Space Code of Conduct* and *Rules of the Road*

These two terms, *Space Code of Conduct* and *Rules of the Road*, are used interchangeably in the CD's discussions on confidence-building measures.[7] In its generic meaning, a *Space Code of Conduct* would consist of a set of norms to guide States' behaviour in respect of their own and/or others' space activities. The *Rules of the Road* sometimes referred to as *Rules of Behaviour*, however, represent either the reaching of agreements on such norms or the norms themselves. Hence, the *Rules of the Road* would be part of the *Space Code of Conduct*. For example, France has advocated that the aim of a *code of conduct* "...is to guarantee the security of space activities while preventing the use of space for aggressive purposes."[8] It has further stated that, "...what is most important is to be able at any time to distinguish an incident of fortuitous or accidental origin from the result of specific aggression. *To that end, it is suggested that a set of rules of behaviour should be drawn up...*".[9] Thus, both concepts would be employed as

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[4] CD/1092, *Op. cit.*, pp. 4-5 (emphasis on original). France's statement has been made partially in response to a Poland proposal in 1989, suggesting that the *Ad Hoc* PAROS Committee should draw on experience built up in the application of confidence-building and security-building measures by the States participating in the CSCE.

[5] *Loc. cit.*

[6] CD/708, *Op. cit.*, p. 2 (Pakistan); CD/PV 413, *Op. cit.*, pp. 20-21 (Pakistan).

[7] For information on other uses of these terms, see CD/PV 402, *Op. cit.*, p. 12 (Poland).

[8] CD/1092, *Op. cit.*, p. 4.

[9] Emphasis added.

yardsticks in the establishment of measures to increase the safety of space objects and the predictability of space activity.

The Federal Republic of Germany[10] has repeatedly advocated that negotiations on these two concepts should be undertaken under the auspices of the CD for a number of reasons. These include the fact that an increasing number of space objects in the form of burned-out buster stages and other non-active objects are not always detectable and could cause serious damage to active spacecraft such as satellites or manned vehicles. Thus, a collision between active space objects and space debris could generate instability, since it might take days or even weeks to determine whether the collision was accidental or not, especially if a communications satellite or other key crisis-management object was involved or, worse, a conflict situation was actually in progress at the time. As in the case of the French delegation, a *space code of conduct* is seen by the German delegation as a mechanism to reduce misinterpretation of space activity and inadvertent collisions with other active space objects. This would create more transparency in respect of accidents in outer space, as well as providing a means of consultation between States in any such eventualities.

The German delegation has also suggested that the CD negotiations should draw on the philosophy and experience of the 1972 bilateral USSR/US agreement for the prevention of incidents on the high seas. It also suggested a number of subject areas from which specific rules could be created. These included a mutual renunciation of measures that would interfere with the operation of other States' space objects; the establishment of minimum distances between space objects; the imposition of speed limits on space objects that approximate one another and on high-velocity fly-by and trailing; restrictions on very low altitude overflight by manned or unmanned spacecraft; stringent requirements for advanced notice of launch activities, grant of or restrictions on the right of inspection; and the establishment of *Keep-out Zones.*[11]

Since some of these "subject areas" are mutually reinforcing, they could in fact overlap without duplicating each other. For example, the maintenance of a minimum distance between space objects was explained by the German delegation as being especially important in avoiding interference with transmitting frequencies. This could probably be achieved by *Keep-out Zones*. However, the German delegation believes that *Keep-out Zones* - which it has defined as a special protected environment bestowed upon registered objects by international agreement[12] - may not only require rules for agreed zones in the area of space objects, but possibly also "... defended, keep-out zones."[13] Another German observation was the need for agreement to inspect the application of certain of these rules. For example, restrictions or a ban on space activities which could be a prelude for satellite attack, such as the measures on fly-by activities.

The various measures mentioned above have sometimes been referred to as a sort of traffic code for space objects and some of them have been formally proposed by

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[10] See "Statement submitted by the Federal Republic of Germany to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 318, 4 July 1985, p. 17; CD/PV 345, *Op. cit.*, pp. 10-11 (FRG); CD/PV 516, *Op. cit.*, pp. 7-8 (FRG); CD/PV 571, *Op. cit.*, pp. 19-20 (Poland).

[11] *Loc. cit.* For a concise discussion on certain characteristics of *Keep-out-Zones* and *Fly-by*, see Hughes, Peter C., *Satellites Harming Other Satellites*, Arms Control Verification Occasional Paper No. 7, Ottawa: Arms Control and Disarmament Division, External Affairs and International Trade, Canada, July 1991.

[12] CD/PV 345, *Op. cit.*, pp. 10-11.

[13] *Loc. cit.*

France within the framework of its proposal on satellite immunity.[14] However, the French proposal was not conceived to be exclusive and focused mainly on the development of rules of conduct for space vehicles to (a) reduce the risk of accidental collisions, (b) prevent incidents, (c) prevent close-range co-orbital pursuits, and (d) ensure better knowledge of space traffic as follows:

- Provision of regular updating, in the event of manoeuvres or drifting, of orbital elements declared at the time of registration;
- The keeping of a minimal distance between any two satellites placed in the same orbit (in order to avoid not only accidental collisions but also short-range co-orbital tracking, which is a precondition for the system of space mines);
- Monitoring of close range passing (to limit risks of collision or interference).[15]

In 1991, a French working paper suggested that these rules might be implemented by:

- A broadening of the Registration Convention relating to **information on launches scheduled** by States;
- A procedure providing for **requests for explanations** in the event of an incident or suspicious activity;
- The identification of **keep-out zones** in the form of two spherical zones moving with each satellite:
  - A **proximity** zone to delimit the location of each space object in reciprocal orbit, as well as the capability of each object to move with respect to the others;
  - A wider **approach** zone, with obligatory notification for passage through it.[16]

The general consensus is that the elaboration of a *Space Code of Conduct* and *Rules of the Road* would constitute a concrete step towards the development of a space order. A number of delegations have expressed their support for the *Code* and the *Rules*,[17] some going as far as actually quoting rules for their implementation. For example, the Soviet Union has stated that it has no objection to the proposals on fly-by manned and unmanned spacecraft.[18] Similarly, the Soviet Union has also considered as a basis of discussion the idea of advance notification of the launching of space objects, and the exchange of information and inspection procedures.

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[14] However, in 1987 the then French Minister of Foreign Affairs, Mr J.B. Raimond, encouraged considerations to entrust the responsibility for the application of a code of conduct to an International Satellite Monitoring Agency.

[15] See CD/937, *Op. cit.*, pp. 6-7 (France); CD/PV 518, *Op. cit.*, pp. 6-8 (France); "Statement submitted by France to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 594, 6 June 1991, p. 18; "Statement submitted by France to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 600, 1 August 1991, p. 3; CD/1092, *Op. cit.*, p. 4.

[16] CD/1092, *Op. cit.*, p. 4 (emphasis on original).

[17] "Statement submitted by the United Kingdom of Great Britain and Northern Ireland to Conference on Disarmament," *Conference on Disarmament*, CD/PV 331, 20 August 1985, p. 21; CD/PV 354, *Op. cit.*, p. 8 (Sri Lanka); "Statement submitted by Belgium to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 424, 23 July 1987, p. 16; CD/PV 425, *Op. cit.*, p. 13 (GDR); "Statement submitted by Bulgaria to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 529, 24 August 1989, p. 17; CD/PV 530, *Op. cit.*, pp. 6-7 (Japan).

[18] CD/PV 511, *Op. cit.*, pp. 7-8.

2. International Trajectography Centre (UNITRACE)

In July 1989, France proposed the creation of an international trajectography centre (UNITRACE),[19] to be set up within the framework of an agreement on the immunity of satellites and possibly as part of the United Nations Secretariat. Membership of the Centre would be open, on a voluntary basis, to all States possessing or using satellites. The French delegation suggested that, since its main objective would be clearly confined to the monitoring of the trajectory of earth-orbiting devices, the Centre could play a key role in building up confidence among States. France further reaffirmed that it was not proposing that the Centre should be a regulatory body laying down rules applicable to space. The Centre's principal functions would therefore be to:

- Collect data for updating registration;
- Monitor space objects;
- Conduct real time calculation of space objects' trajectories.[20]

These functions would enable the Centre to warn the parties concerned when space objects were too close to each other in the same orbit or expected to pass too close.[21] In addition, the Centre would be expected to provide *proof of good faith* in the event of alleged deliberate collision. Furthermore, its technological facilities would enable it to play an active role in the prevention of incidents and in the provision of advance notification of orbital parameters (or lack of it) such as in the case of satellite manoeuvres. In this regard, the French proposal also suggested the establishment of *Consultation Machinery* to resolve any dispute that might arise concerning the identity or position of space objects.

The proposal went on to explain that the Centre would be dependent on the data provided by each State concerning its own satellites or the satellites it had detected.[22] Since the credibility and volume of the data - in this information-gathering process - would not depend on the Centre's own capacities of detection, the implication is that the Centre would need to have the necessary high-performance tracking and computer devices to detect and constantly monitor the orbits and immediate environment around hundreds, probably even thousands, of space objects. Existing sensor technology does permit, to some extent, of ground-to-space satellite observation and tracking, but this technology is mostly used by the armed forces and its availability to other users is somewhat limited. Therefore, because of the functions to be entrusted to it, the Centre would require instruments such as optical-visible light (telescopic and other cameras), mechanical steerable dish and/or phased array radars, infra-red radars, and even radio beams to detect, observe and photograph low-orbit satellites. To this preliminary list of technical devices should probably be added sensors for detecting and tracking objects in

[19] CD/937, *Op. cit.*; CD/PV 570, *Op. cit.*, p. 11.
[20] CD/1092, *Op. cit.*, p. 6.
[21] CD/937, *Op. cit.*, p. 10 (France).
[22] *Loc. cit.*

higher orbits, such as telescopes equipped with radiometers and other electro-optical sensors, as well as some kind of laser and beacon tracking devices.[23]

Moreover, to fulfil its function properly, the Centre would also require constantly upgraded information on orbits and manoeuvres. While the French proposal argued that the existence of such a data base would lead to a higher level of transparency, it also recognized that the nature of this data-gathering is such that the protection of technological and military secrets would be a serious consideration. Accordingly, two procedures were proposed to reconcile constraints of confidentiality with the required intense gathering of information on the trajectories of satellites. After having alerted only the State or States concerned where necessary, the information received on the orbital parameters and any change of trajectory, which would be used for permanent calculations of all trajectories of the objects on record, would first be stored but not published and, secondly, it would be grouped in a *black box* system for additional security.

3. Satellite Image Processing Agency (SIPA)

In 1989, France proposed the creation of a satellite image processing agency (SIPA), which is also known as the Agency for the Processing of Satellite Image (APSI).[24] SIPA would constitute the initial phase of a wider endeavour and could, at a later stage, become an integral part of an international institution for satellite monitoring. However, the French initiative clearly stated that the proposed agency "...would be a confidence-building device and would not be intended to be the embryo of a verification system with universal competence attached to the United Nations".[25] Instead, SIPA is to be understood as an agency to be created within the framework of confidence-building and security-building measures.

SIPA would be designed as a low-cost agency with three objectives.[26] The first of these would be to collect and process data obtained from existing civilian satellites, and then to disseminate this material to the Agency's members. As shown in Table IX, the agency's sphere of action would be threefold: disarmament; crisis control; and the prevention and handling of natural disasters and development programmes. In terms of disarmament, SIPA would have two main functions - to collect data to facilitate the verification of disarmament agreements, and to serve as a clearing-house for the exchange of data, the establishment of certain facts such as force estimates in advance of the conclusion of disarmament agreements, and the monitoring of compliance with disengagement agreements in local conflicts. The expected resolution from civilian observation or weather satellites ranges from 5 to 10 meters. Whenever possible, higher resolutions would also be considered but would be supplied by aircraft and not space-based devices.

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[23] For example, the idea of equipping all space objects with active tags such as beacon devices has been discussed in a Canadian *Arms Control and Verification Occasional Paper* (see Hughes, *Op. cit.*). The French delegation has specifically called for a thorough study on such possibility, "...since, if it was proved to be feasible, it might considerably facilitate the task of an international trajectography centre."

[24] "Letter Dated 1 August 1989 from the Representative of France Addressed to the Secretary-General of the Conference on Disarmament Transmitting a Working Paper entitled 'Space in the Service of Verification: Proposals Concerning a Satellite Image Processing Agency'," *Conference on Disarmament*, CD/945, 1 August 1989; see also "Statement by Mr Roland Dumas before the General Assembly," 2 June 1988, as well as GA document A/S-15/34.

[25] CD/937, *Op. cit.*, p. 5, emphasis on original.

[26] CD/937, *Op. cit.*, pp. 4-5; CD/945, *Op. cit.*, pp. 4-6; see also A/S-15/34, *Op. cit.*

TABLE IX

Proposed Structure of a Satellite Image Processing Agency (SIPA)

Principal Function	Optical Data Equipment (visible or near infra-red spectrum)	Expected Resolution	Origin of Data (civilian satellites)
- Disarmament - Crisis control - Natural disasters and development programmes	- Digital or analogue data - Photographic data (chromatic, colour, or spectral photography - Cartographic data	- 5 to 10 metres - very-high-resolution data supplied by aircraft	- previously recorded by satellites - existing weather satellites - existing or planned Earth observation satellites

Unlike its first two functions (which are directly linked to international security), SIPA's third function would assist multilateral development programmes, including those administered by the United Nations.[27] For the agency's structure, the French proposal envisaged subdivisions by type of assignment leading to four spheres of operation. Accordingly, Table X shows the general functions and specific technical features of each of the four subsystems.

TABLE X

Proposed Subsystems of a Satellite Image Processing Agency (SIPA)

Subsystem	General Functions	Special Technical Features
• Data Processing Subsystem (DPS)	- convert raw input into digital, photographic, or other to meet user's needs - check the validity of all scene identification parameters - determine identification parameters (processing of remote maintenance data for the preparation of calibration tables)	- conversion of photographic and cartographic data into usable digital data - conversion of satellite data into usable data (e.g., after correction of various radiometric and geometric errors)
• Data Management Subsystem (DMS)	- data quality control	- reproduction of data - data storage, archiving and cataloguing - data security
• Data Analysis Subsystem (DAS)	- convert non-analyzed data into information to be used by SIPA and by the users - combine manual (visual) techniques of photo interpretation and computer-assisted interpretation	- contrast accentuation - noise elimination - linear filtering - utilization of false colours - production of composite images - analysis of scenes using auxiliary cartographic or other data
• Data Dissemination Subsystem (DDS)	- disseminate restricted or unrestricted data.	- manipulate data in the form of: – permanent image: films, tracings – magnetic tapes

[27] CD/945, *Op. cit.*, p. 4.

SIPA's second objective would be to serve as a research unit or centre charged with (a) identifying groups of satellites which could contribute to the implementation of multilateral civilian or military programmes, and (b) designing various possible linkages between ground sensors and satellite-borne detectors for the verification of disarmament agreements.[28] It is hoped that the experience gained will assist in determining whether treaty-specific satellites should be developed in the future or whether multipurpose satellites or systems would be more appropriate. Ultimately, however, SIPA is expected to "...offer a real testing ground for the development of new technologies".[29] SIPA's third objective would be to train national personnel to interpret space images and ascertain the extent to which the monitoring and verification of arms limitation and disarmament could be performed by means of satellite imagery.

In a 1991 working paper presented at the CD, France elaborated on the idea of the creation of *regional agencies responsible for transparency*, where France reiterated its readiness to contribute to the pursuit of the following measures:

- **Training specialists** in the interpretation of satellite data;
- Studying of the possible structure and size of the **reception facilities** (engineering) which might be made available to States participating in such agencies;
- Initiate more far-reaching consideration of the question of access to data and satellite information and **discussions with other countries producing space images**, with a view to possible agreements to supply regional agencies at their request with the information they need to perform their tasks.[30]

No detailed reactions to the French proposal have been presented to the CD, but the idea of creating data bases and centres which could provide both experience on data-gathering from existing satellites and staff training in the relatively new field of satellite imagery interpretation for the purpose of arms limitation and disarmament has found some support. For example, in 1990, the delegation of Czechoslovakia to the CD similarly proposed the creation of a data base on the launching of satellites and the collection and classification of technical data.[31] However, that proposal went further by suggesting that the data base could be established in conjunction with a scientific centre at which scientists from different countries could share their experience in this field. In yet another proposal, dated August 1990, a Group of Governmental Experts undertaking an in-depth study of the role of the United Nations in the field of verification concluded that the organization of a centre where satellite data could be gathered, and the training of basic photo-interpretation could be offered, would constitute a first step towards a satellite network for the verification of arms limitation and disarmament.[32]

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[28] CD/945, *Op. cit.*, p. 6.

[29] *Loc. cit.*

[30] CD/1092, *Op. cit.*, p. 7 (emphasis on original). In its 3 June 1991 Arms Control and Disarmament Plan, France stated that it "...would be willing to disclose information available to it to **regional agencies responsible for transparency**. It would favour the transmission to such regional agencies of the means of observation, in particular those in outer space that as may be available to Europe and the United Nations." See "Letter Dated 3 June 1991 from the representative of France Addressed to the President of the Conference on Disarmament transmitting the Text of the Arms Control and Disarmament Plan Submitted by France on 3 June 1991, *Conference on Disarmament*, CD/1079, 3 June 1991, p. 4.

[31] "Statement submitted by the Czech and Slovak Federal Republic to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 570, 2 August 1990, p. 24.

[32] "Verification in All Its Aspects," *Official Records of the General Assembly*, A/45/372, 28 August 1990, p. 86.

4. *Open Outer Space*

In addition to individual and joint statements and proposals made at the CD, some delegations have advocated that the implementation of a wide range of confidence-building measures to foster transparency and safety in space activities would also be a viable approach in achieving mutual confidence. The concept of *open outer space* has therefore been presented as one such initiative to reach that particular goal. At present, *open outer space* is generally believed to be modelled on the so-called "Stockholm approach", whereby confidence would be built-up step by step. Thus the *Ad Hoc* PAROS Committee would begin by reaching agreement on a measure such as data exchange and then gradually build up confidence to obtain agreement on a measure more directly concerned with arms limitation. The Soviet Union has suggested that this concept be examined by the CD since, in its view, the most important measures related to the realization of the *open outer space* are:

- The strengthening of the 1975 Registration Convention;
- The elaboration of *rules of the road* or a *code of conduct* for space activities;
- The use of space-based monitoring devices in the interest of the international community;
- The establishment of an international space inspectorate.[33]

The Soviet statement further suggested that the French proposal on the creation of a satellite image processing agency "...also deserved a positive response".[34] However, since 1991 the Soviet delegation has dropped the use of *open outer space*, claiming that outer space is already open and that the term states the obvious.[35] This illustrates that the concept of *open outer space* on the one hand, and confidence-building measures in general on the other, have still not yet been thoroughly examined either by the CD or the *Ad Hoc* PAROS Committee.[36]

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[33] CD/PV 560, *Op. cit.*, pp. 11-12 (USSR); see also a discussion in CD/PV 571, *Op. cit.* pp. 19-20 (Poland).

[34] CD/PV 560, *Op. cit.*, p. 12.

[35] The Soviet position on the possibility of implementing step-by-step confidence-building measures has reportedly not changed.

[36] In addition, besides emphasizing the need to develop further the notion of confidence-building measures, the Soviet delegation has also called for the CD, in a 1991 "Friend of the Chairman" working paper, to consider the concept of *predictability measures*. As discussed in Part I, Chapter I, C., discussions on *predictability measures* have received particular attention within the framework of the bilateral USSR/US DST/NSTs.

CHAPTER IV: POSSIBLE INSTITUTIONAL ARRANGEMENTS

Monitoring and verification are matters of much concern to the Conference on Disarmament and not least the mechanism which would have to be set up as part of any international agreement on the prevention of an arms race in outer space. The terms *monitoring* and *verification* are often used interchangeably, but strictly speaking, monitoring is an observation process to collect information relating to an agreement, but without necessarily verifying compliance with that instrument. A member of the French delegation has described it as "...the general collection of data which can be effected by multi-purpose observation satellites".[1] Verification, on the other hand, has been called a measure that "...can only be undertaken within the context of a specific agreement, in order to ensure that the agreement is being complied with, and can only be carried out by the countries party to the agreement".[2] Accordingly, verification justifies the deployment of equipment which would be employed only by the contracting parties to the particular treaty in question.

The meanings of these two terms have, therefore, been discussed at some length. Considerable effort has also been made, within the framework of the CD, to establish international monitoring and/or verification mechanisms, most of them involving the use of space-based devices. Accordingly, the proposals discussed below have been concerned with space-to-space and space-to-ground remote sensing, but not ground-to-space observation.[3] Proposals put forward outside the CD, however, have included one by the Parliamentary Association of the Western European Union to the effect that a European system of observation satellites should be created for disarmament verification.[4] A similar initiative is the Swedish Tellus study on the technical and financial aspects of developing case-specific satellites for space-to-Earth verification purposes.[5] The importance of such proposals has frequently been stressed at the CD and they are mentioned here because of their affinity with the work of the *Ad Hoc* PAROS

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[1] CD/937, *Op. cit.*, p. 5; see also *Official Records of the General Assembly*, A/S-15/34, 8 June 1988. This basic approach to the application of monitoring techniques has been adopted by other countries including Bulgaria, Czechoslovakia, and the Soviet Union who have proposed the monitoring of military activities in conflict areas and in the sphere of disarmament to collect data and provide predictability. See "Establishment of an International Verification Mechanism under the Auspices of the United Nations", Working Paper submitted by the Delegations of Bulgaria, Czechoslovakia, and the Soviet Union, *Official Records of the General Assembly*, A/S-15/AC.1/15, 13 June 1988.

[2] CD/937, *Op. cit.*, p. 5; for a longer description of the French delegation's definition of verification, see A/S-15/34, *Op. cit.*; for a similar stand by Bulgaria, Czechoslovakia, and the Soviet Union on the purpose of verification, see A/S-15/AC.1/15, *Op. cit.*

[3] The reason for this is that no such proposals have been submitted to the CD. However, this does not signify a lack of interest on the part of CD delegations. For example, the Swedish delegation has emphasized the importance of inspecting a satellite from the ground by means of telescopes, modern electro-optical sensors, and radar devices for the tracking of low Earth orbit satellites (CD/PV 516, *Op. cit.*, p. 19). For a discussion on the use of ground-based monitoring instruments for verification, see, for example, Frank R. Cleminson and Péricles Gasparini Alves, "Space Weapon Verification: A Brief Appraisal," in Serge Sur (ed.) *Verification in Disarmament: Trends and Developments*, (forthcoming 1992). It may also be noted that the idea of creating an international centre partially performing ground-to-space observation of satellite trajectories could provide the international community with valuable experience which would enable such a technique to be used for the verification of an agreement on the prevention of an arms race in outer space.

[4] See *Observation Satellites - a European Means of Verifying Disarmament*, Symposium, Rome 27th-28th March 1990, Assembly of Western European Union, Technological and Aerospace Committee. See also other initiatives and proposals described in "A Regional Monitoring Agency", by Bhupendra Jasani, *Environmental Conservation*, 10 (3), 1983. p. 255f; "International Surveillance of Outer Space for Security Purposes", by Luciano Anselmo, Bruno Bertotti and Paolo Farinella, *Space Policy* (forthcoming 1991).

[5] See "Technical Study of a Verification Satellite: Project Tellus", Final Report, Solna, September 1988; and *A Multinational Verification satellite? A preliminary Study*, the Swedish Defense Research Establishment, FOA, March 1987. For other Swedish studies on the use of verification satellites, see *A Global and Secure Data Exchange System for Verification of Arms Control and Disarmament Treaties*, the Swedish Defense Research Establishment, Department of Information Technology, Linköping, May 1988.

Committee.[6] However, neither of them has officially been placed before the Committee, whereas the PAXSAT concept presented by the Canadian Ministry of Foreign Affairs in 1986 has been examined in session, inspiring some delegations to comment that its conceptual framework was particularly fitting to certain types of verification.

A. Monitoring Institutions

It is obvious that any monitoring or verification mechanism of arms limitation and disarmament agreements will be a very complex matter involving a wide spectrum of procedures such as earth-to-space, space-to-space, space-to-earth, air-to-ground, and on-site monitoring. Such an elaborate network would necessarily have to be designed to improve confidence-building measures and in some cases monitoring would also have to help to ensure compliance with certain contractual obligations - e.g.:

- the ban on the threat or use of force, including *rules of the road* and/or *code of conduct*;
- obligations on the immunity of objects in outer space, including non-interference with the normal functioning of space objects;
- prohibition on testing and placing of weapons in space, subject to arrangements with a specific weapons' treaty;
- crisis situations (early warning, cease-fire, peace-keeping, etc...).

However, the manner in which a future outer space agreement can be monitored is not easily discernable, partly because the *Ad Hoc* Committee has not yet decided on the type of negotiation it wishes to conduct. Nevertheless, two proposals delineating various potential legal and other aspects of an international monitoring system have been the subject of much discussion. One of them was originally launched in May 1978 by the then French President Giscard d'Estaing. The other proposal was put forward by the Soviet Union in August 1989 to the *Ad Hoc* PAROS Committee, and suggested the creation of an international space monitoring agency. However, while the French and Soviet proposals are both fairly comprehensive on the institutional aspects of an agency, neither of them has exhaustively addressed all the technical aspects involved.

1. International Satellite Monitoring Agency (ISMA)

At the first United Nations Special Session on Disarmament (UNSSOD I) in June 1978, the French Government tabled a detailed proposal for the establishment of an International Satellite Monitoring Agency (ISMA)[7] as illustrated in diagram C. One of the proposal's main features was that existing and future disarmament and security agreements should be monitored, presumably via some special arrangement between the

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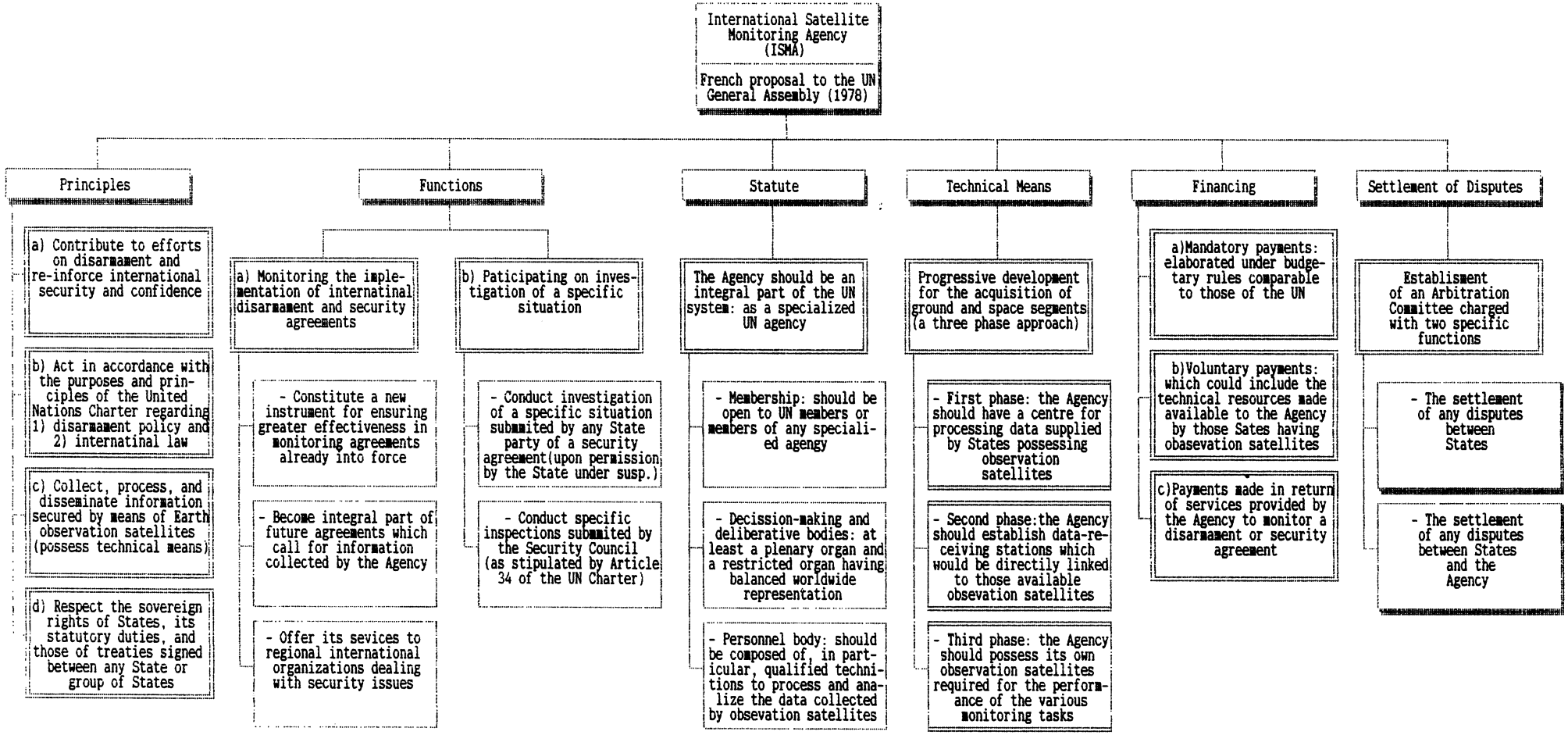
[6] Of interest is the "Statement submitted by Italy to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 571, 7 August 1990, p. 7. As pointed out by the Italian delegation, the Western European Union meeting had concluded that "...the necessary technical requirements for a viable regional system of verification of disarmament agreements are already available".

[7] "Note verbale dated 30 May 1978 from the Permanent Mission of France addressed to the Secretariat," *Official Records of the General Assembly*, A/S-10/AC.1/7, 1 June 1978.

Diagram C



Source: "Note verbale dated 30 May 1978 from the Permanent Mission of France addressed to the Secretariat", UN General Assebly, A/S-10/AC.1/7.

contracting State Parties and the Agency. In addition, the Agency would also have the statutory flexibility of permitting its services to be offered to regional international organizations dealing with security issues. Investigation of alleged violations was also proposed but subject, however, to the possibility of refusal on the part of the State under suspicion or to a veto in the Security Council. A second feature was the establishment by ISMA of an arbitration commission to settle disputes between States or between a State or States and the agency. Accordingly, it was also suggested that the Agency should supply the parties under dispute with satellite monitoring information.

The French paper also proposed that, because of technological, time, and budgetary constraints, the Agency should be set up in three stage. As a first step, the Agency would be able to start operation without owning the space segment of a remote sensing system and would simply have a centre for processing data supplied by States possessing satellites. The second phase would entail a more complex participation by the Agency since the Agency would need to own and operate data-receiving stations with direct links to available satellites. In the third, optimal, phase, the Agency would possess both space and ground segments of the remote sensing system.

This proposal by France having raised a number of questions, the UN General Assembly requested the Secretary-General to (a) obtain the views of Member States on the proposal and (b) conduct a feasibility study of the technical, legal, and financial implications involved in setting up an agency of this kind.[8] A Group of Governmental Experts concluded a first study on October 1979. These preliminary conclusions were very supportive of ISMA and laid down the structure of a more detailed study to be undertaken the following year.[9] This feasibility study, entitled "The Implications of Establishing an International Satellite Monitoring Agency",[10] is the most comprehensive report to date on the implications involved in the establishment of the ISMA.[11]

To date, no delegation has proposed the use of its national remote sensors for the establishment of this agency. Nor there has been further action by successive French or other Governments with the view of implementing ISMA.[12]

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[8] *Official Records of the General Assembly*, 33/71 J, December 14, 1978, p. 52; for views of Member States on the French proposal, see *Official Records of the General Assembly*, A/34/37.

[9] See "Monitoring of Disarmament Agreements and Strengthening of International Security," Review of the Implementation of the Recommendations and Decisions adopted by the General Assembly at its Tenth Special Session, Report of the Secretary-General, *Official Records of the General Assembly*, A/34/540, October 18, 1979.

[10] See "Study on the Implications of Establishing an International Satellite Monitoring Agency," *Official Records of the General Assembly*, A/AC.206/14, New York: United Nations Publications, 6 August 1981; "The Implications of Establishing an International Satellite Monitoring Agency," Report of the Secretary-General, Department of Disarmament Affairs, *Study Series*, No. 9, New York: United Nations Publication, 1983; see also a follow-up to this proposal in "Statement submitted by France to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 390, 19 February 1987, pp. 8-9.

[11] An indepth discussion of this study would not be appropriate here. However, the increasing call on the part of CD delegations for a re-evaluation of the ISMA justifies a summary of its main conclusions (see Annex E). In particular, since such a summary could put in perspective the complex and multifaceted nature of technical and financial issues involved in this and other monitoring proposals. In addition to general support for the inherent principles of the French ISMA proposal, there have been several calls in the CD for the *Ad Hoc* PAROS Committee to consider questions pertaining to the establishment of the ISMA: for example, "Statement Submitted by the Federal Republic of Germany to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 318, *Op. cit.*, p. 16 (FRG); CD/PV 402, *Op. cit.*, pp. 11 (Poland); CD/PV 404, *Op. cit.*, pp. 11-12 (Sri Lanka); CD/PV 413, *Op. cit.*, p. 21 (Pakistan); "Statement submitted by Australia to the *Conference on Disarmament*," CD/PV 426, 30 July 1987, p. 12; CD/PV 460, *Op. cit.*, p. 15 (Pakistan); CD/PV 516, *Op. cit.*, p. 19 (Sweden); A/S-15/AC.I/15, *Op. cit.*, (Bulgaria/Czechoslovakia/USSR).

[12] As discussed earlier, France has made a specific proposal on the issue of possessing satellite data (see *supra*, Part II, Chapter III, B, 3, Satellite Image Processing Agency) independently of the implementation of ISMA.

2. International Space Monitoring Agency (ISMA)

The general concept of an ISMA introduced by the French proposal and the Report of the Group of Governmental Experts on the main tasks and implications of such an agency stimulated other States to table variant proposals and alternative measures. The most comprehensive initiative was perhaps that made by the Soviet delegation at the third special session of the United Nations General Assembly on disarmament in 1988, when the Soviet Union proposed that the CD should be charged to undertake detailed negotiations on the establishment of an International Space Monitoring Agency, also known by the initials ISMA.[13] The Soviet proposal has since been discussed and elaborated further on various occasions in other fora. Overall, the Soviet ISMA closely resembles its French counterpart in its structure. However, important differences do exist. For example, if compared to the French initiative as depicted in Diagram C, the Soviet ISMA would also be based on the same principles but with some reservations, one being the Agency's possession of satellites.

The functions of the Soviet ISMA would not be quite the same as those shown in Diagram C. In particular, the Soviet initiative would also include the supply of information in compliance with multilateral arrangements in the field of confidence-building measures. Nevertheless, it would seem that the functions of the Soviet ISMA would be widened to allow the Agency to make recommendations about the different procedures for monitoring or verifying space facilities. The Agency would also cover any possible arrangements on the PAROS, as well as paying special attention to the monitoring of conventional armed forces and confidence-building measures on the European scene. Accordingly, it seems that the Soviet Union would be in favour of its ISMA monitoring a future CW Convention, a comprehensive nuclear test-ban treaty, and nuclear free-zone arrangements as well as natural disasters and other emergencies.

As in Diagram C, the statutes and financement of a Soviet ISMA would be conceived as a specialized agency of the United Nations system with subdivisions as given in Diagram C. However, while the French proposal did not specify the nationalities of the Agency's personnel, the Soviet proposal limited qualified personnel to space monitoring experts of Member States supplying space monitoring materials.

The Soviets' proposed technical means for establishing the Agency also differed from the French proposal in that it contained some of the main conclusions of the Report of the Group of Experts discussed above. The Soviets suggested that the Agency should be developed in two stages instead of three. The first stage would be a period for training the personnel and structuring the Agency itself during which information would be supplied by states possessing space monitoring facilities and a Space Image Processing and Interpretation Centre would be created. The second stage would primarily involve the development of the ground-segment by creating a network of data-reception points.

As for the question of monitoring, discussions at the *Ad Hoc* PAROS Committee have emphasized that the Agency would need to receive information from ultraviolet, visible and IR range, radar spectrometric, radio-electronic devices. In the first stage, the resolution of information supplied by national space monitoring means to the ISMA operations is expected to be of the magnitude of 5 m or more, which would probably not

[13] A/S-15/34, *Op. cit.*, p. 5.

enable all the functions envisaged in the Soviet proposal to be carried out. However, it is believed that the Soviet Union is not, in principle, against supplying the Agency with smaller resolutions at a later stage in concert with the United States. Nor is the Soviet Union against the idea of launching ISMA satellites from Soviet carrier rockets,[14] or the provision of flight control complexes and data reception stations. It also seems that the Soviet Union views its participation in joint R&D of ISMA satellites and ground stations for ground, air, and outer space monitoring application in a favourable light, even though it is not specified in the Soviet proposal.

B. Verification of Treaty Obligations

1. International Space Inspectorate (ISI)

In March 1988, the Soviet Union proposed the creation of an International Space Inspectorate (ISI) to verify the non-deployment of weapons of any kind in outer space.[15] This proposal constitutes the most comprehensive initiative tabled at the CD to date linking a verification mechanism directly to an agreement on the prevention of an arms race in outer space, as may be seen from Diagram D. The ISI is based on the principle of on-site inspections before space objects are launched, and the envisaged scope of prohibition would include weapon systems equipped to conduct ground, air, or outer space strikes, "...irrespective of the physical principles on which they are based."[16] However, the proposal excluded certain types of ballistic missiles from verification - namely, those ballistic missiles "...whose launches are not connected with placing any objects into the orbit of an artificial Earth satellite or on a flight path to other heavenly bodies..."[17] In principle, this definition would cover both ASAT weapons and ABM weapons (i.e., those intended to perform in ASAT modes) and their systems.

The initiative proposes that on-site inspections should be carried out by permanent inspection teams, stationed in proximity to the launching sites, who would be given such information on forthcoming launches as the place, date and time, the type of launch vehicle, the orbital parameters, together with general data on the space object concerned. The launching State would be obliged to provide the ISI inspectors with sufficient evidence that the space object would be neither a weapon in itself nor an object equipped with weapons. The receiving State would also have to provide the ISI inspectors with the instruments, equipment, materials, transport, and suitable site necessary to carry out their observations.[18] A suggestion that the extent of the inspection might be extended was made by the then Minister of Foreign Affairs of the

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[14] *Ibid.*, p. 5.

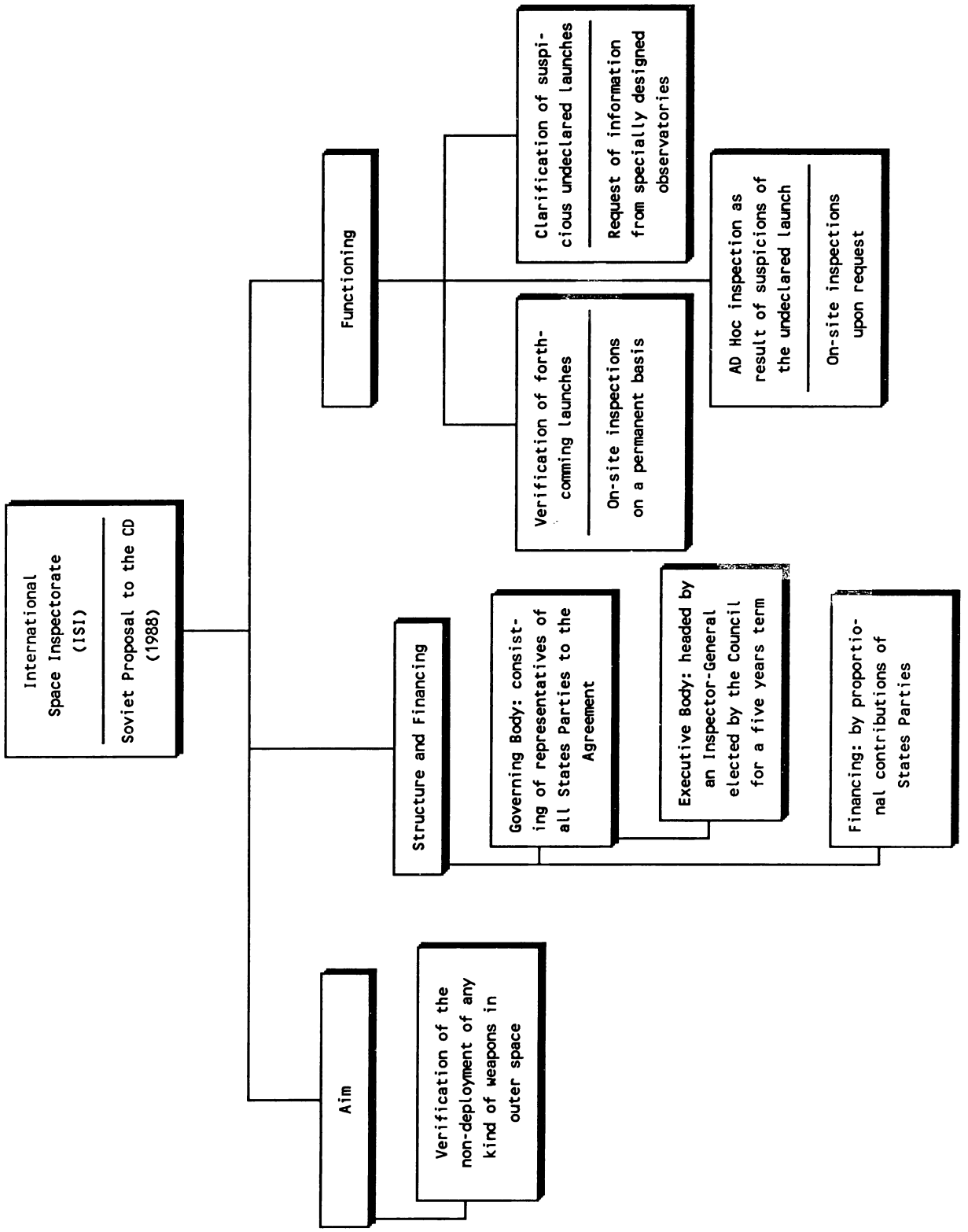
[15] See "Letter Dated 17 March 1988 from the Representative of the Union of Soviet Socialist Republics addressed to the President of the Conference on Disarmament, transmitting the Text of a Document entitled 'Establishment of an International System of Verification of the Non-Deployment of Weapons of Any Kind in Outer Space'", CD/817, 17 March 1988. However, the Soviet delegation to the CD had already proposed, in 1987, the creation of an international inspectorate within the framework of an international verification system to guarantee compliance with a treaty prohibiting the use of force in outer space and from space against the Earth (see CD/PV 385, *Op. cit.*, p. 22; "Statement submitted by the Union of Socialist Soviet Republics to the *Conference on Disarmament*", CD/PV 428, 6 August 1987, pp. 9-10).

[16] CD/817, *Op. cit.*, p. 3.

[17] *Loc. cit.*

[18] *Ibid.*, p. 5.

Diagram D


International Space Inspectorate (ISI)
Soviet Proposal to the CD (1988)
Aim
Verification of the non-deployment of any kind of weapons in outer space
Structure and Financing
Governing Body: consisting of representatives of all States Parties to the Agreement
Executive Body: headed by an Inspector-General elected by the Council for a five years term
Financing: by proportional contributions of States Parties
Functioning
Verification of forthcomming launches
On-site inspections on a permanent basis
Clarification of suspicious undeclared launches
Request of information from specially designed observatories
AD Hoc inspection as result of suspicions of the undeclared launch
On-site inspections upon request

USSR, Mr E. A. Shevardnadze, who stated that "...in the event of a total ban on space strike arms, the Soviet Union would be willing to extend inspections to storage facilities, industrial plants, laboratories, testing centres, etc..."[19]

A major feature of the ISI proposal is the verification of undeclared launches. A State party to the ISI would have the right to request the Inspectorate to obtain clarification from any other contracting party having made a suspicious undeclared launch. Should the requested clarification be considered as insufficient, the ISI proposal contains a provision allowing the Inspectorate, if so requested, to conduct "...an *ad hoc* inspection at the launching site and in the area in which detachable parts of the launch vehicle and spacecraft land".[20] In such an eventuality, the State to be inspected would have to reply the ISI within 24 hours of receiving a request for inspection and an *ad hoc* inspection team would be permitted to conduct ground or air inspection or both simultaneously. The Soviet proposal did not, however, refer to possible refusals of inspection, perhaps because of its view that " [i]f a state has no intention of putting weapons in space, there can be no reason for it to object to international inspections of its space activities."[21]

Most of the support for the ISI came from delegations belonging either to the former Group of Socialist States or to the Group of 21, only a few delegations in the Group of Western countries expressing themselves in favour of the Soviet proposal. The delegation of Czechoslovakia expressed its willingness "...to allow checking of all the [its] technical devices launched into space under the Interkosmos programme".[22] Some countries, particularly those which advocate the strengthening of the Registration Convention, sustained the central idea of conducting on-site inspections.

Other delegations have expressed some scepticism about the scope and application of the proposal while others have even rejected it. For example, while supporting the idea in general, the delegation of Mongolia made it clear that additional control measures would be needed if the work of the Inspectorate were to cover just one category of weapon, because the ISI would not exhaust all the control possibilities of space weaponry.[23] The Mongolian delegation accordingly advanced the idea of combining the proposed ISI with "...[NTMs] of verification and control and collective consultative machinery which would deal with disputes".[24] For its part, the US delegation questioned the actual need for an inspectorate arguing that existing treaties already regulate military activities in outer space. In the US view, the proposal could, therefore, be more destabilizing then stabilizing.[25]

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[19] CD/PV 428, *Op. cit.*, p. 10.

[20] CD/817, *Op. cit.*, p. 6.

[21] CD/PV 428, *Op. cit.*, p. 10.

[22] "Statement submitted by Czechoslovakia to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 527, 17 August 1989, pp. 8-9; see also CD/PV 402, *Op. cit.*, p. 12 (Poland); CD/PV 428, *Op. cit.*, p. 10 (USSR); "Statement submitted by Bulgaria to the *Conference on Disarmament*", CD/PV 402, 2 April 1987, pp. 18-19; "Statement submitted by Canada to the *Conference on Disarmament*", CD/PV 433, 25 August 1987, p. 9; "Statement submitted by Czechoslovakia to the *Conference on Disarmament*", CD/PV 390, 19 February 1987, pp. 12-13; CD/PV 425, *Op. cit.*, p. 14 (GDR); CD/PV 400, *Op. cit.*, pp. 12-13; CD/PV 460, *Op. cit.*, p. 14 (Pakistan).

[23] "Statement submitted by Mongolia to the Conference on Disarmament," *Conference on Disarmament*, CD/PV 400, 26 March 1987, pp. 12-13.

[24] *Loc. cit.*

[25] See a statement quoted in CD/905, *Op. cit.*, p. 17 (Mongolia).

2. PAXSAT

PAXSAT, or peace satellite, is a verification concept using space-based remote sensing technology. It has two potential applications, called PAXSAT A and PAXSAT B respectively, and although still in the research stage, it has been the subject of a presentation by the Canadian delegation to the CD.[26] In the first application, PAXSAT would be associated with agreements on outer space which entails space-to-space remote-sensing capability. By using non-classified technology, PAXSAT A research is aimed at designing a satellite which can accurately ascertain whether other objects in orbit are able to perform as space weapons (e.g., dedicated ASAT weapons) or have space weapon capability. However, it should be noted that the verification of a non-dedicated ASAT weapon's non-compliance with a treaty would still remain a problem. Nevertheless, this particular aspect of PAXSAT research is important because it complements other proposals on the verification of space weaponry.

PAXSAT B, on the other hand, is a segment of a Canadian research project which is to be associated with agreements calling for the regional verification of conventional forces and weaponry and will include space-to-ground observation. In addition, PAXSAT research also embraces the development of a data-base, presumably on space objects for application A and on conventional forces and weapons for application B.

Because of its objective and nature, PAXSAT "A" has been at the centre of the CD's discussions on Canadian research projects on outer space, especially as it has been proposed as a *treaty specific* application.[27] More specifically, the operation of the PAXSAT system, which involves both the ground/space segment and its decision-making apparatus, is to be associated with individual multilateral agreements and will not have an application outside of any such agreements. For example, the conceptional system data flow shown in Diagram E demonstrates how PAXSAT satellites are intended to operate within the framework of a given treaty on the PAROS. After identification by the space-tracking network of the space object to be verified, a PAXSAT A verification mission could be performed by two different techniques,[28] one of which would require the launching of PAXSAT satellites while the other would involve the use of PAXSAT satellites placed in parking orbits. Preliminary observations have indicated that the most useful procedure for determining the functions of a space object by PAXSAT "...would be to co-orbit and keep station with the target over a reasonably lengthy period of time."[29] However, the PAXSAT satellites would not in any case perform permanent verification of each and every object launched into space. Since the whole system would be linked to a particular treaty, PAXSAT satellites would only operate specific verification requested by the Treaty Specific Consultative Authority. Verification to

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[26] See "Statement submitted by Canada to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 367, 3 July 1986, pp. 28-29; "Statement submitted by Canada to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 410, 30 April 1987, pp. 13-14; "Survey Report of the Outer Space Workshop held in Montreal on 14-17 May 1987", submitted by Canada to the *Conference on Disarmament*, CD/773, 20 July 1987; see also "PAXSAT Concept: The Application of Space-Based Remote Sensing for Arms Control Verification", External Affairs, Canada, *Verification Brochures* No. 2, 1987; F.R. Cleminson, "PAXSAT and Progress in Arms Control", *Space Policy*, May 1988, pp. 97-102; F.J.F. Osborne, "The PAXSAT Concept: A Study of Space to Space Remote Sensing": In *A Proxy for Trust: Views on the Verification Issue in Arms Control and Disarmament Negotiations* (John O'Manique, ed.), Ottawa: The Norman Paterson School of International Affairs, pp. 89-100.

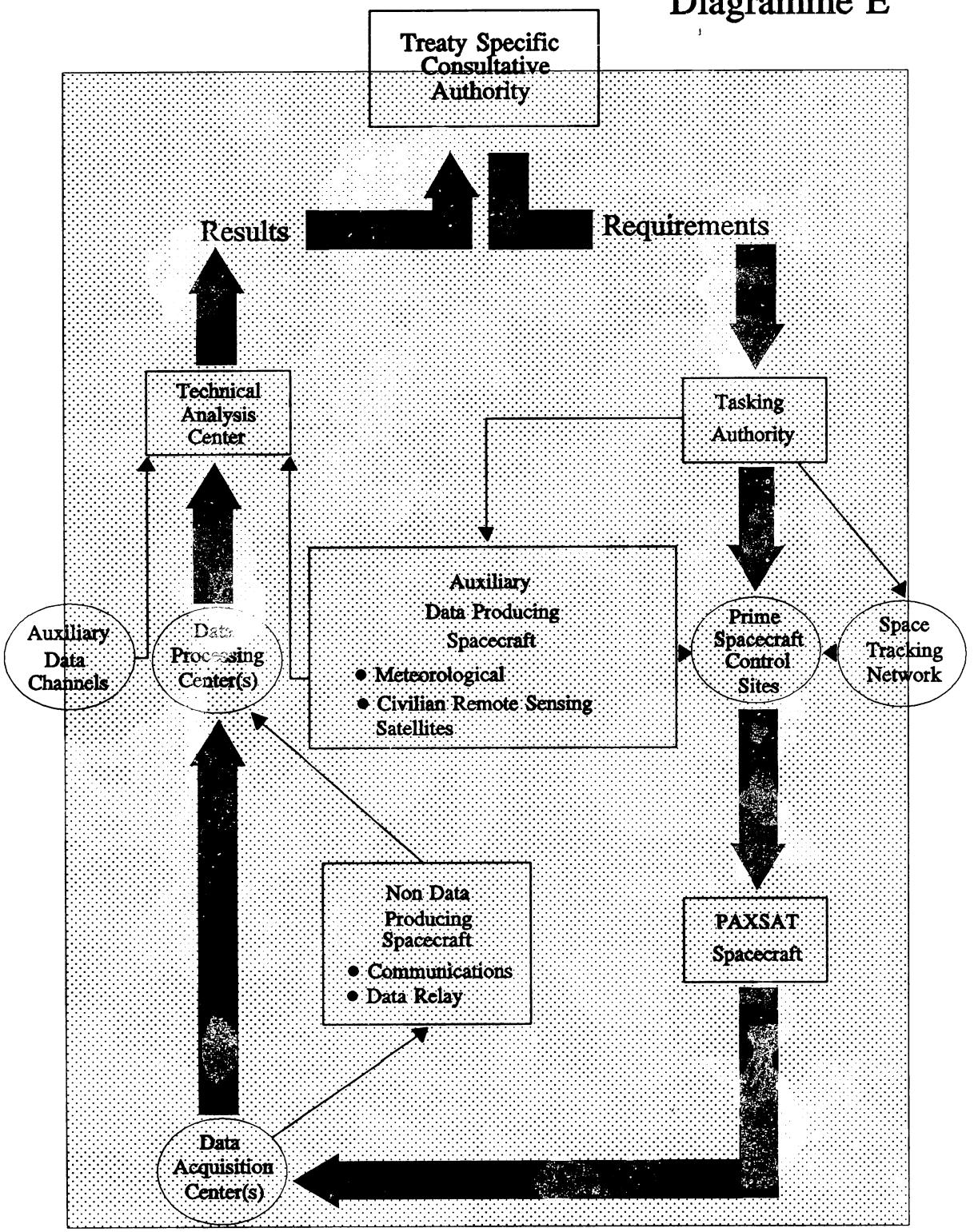
[27] For a discussion, see, in particular, CD/PV 410, *Op. cit.*, pp. 13-14 (Canada).

[28] CD/773, *Op. cit.*, pp. 4-5 (Canada).

[29] "PAXSAT Concept: The Application of Space-Based Remote Sensing for Arms Control Verification", *Op. cit.*, p. 41.

PAXSAT Conceptional Systems Data Flow

Diagramme E



Source: "PAXSAT Concept: The Application of Space-Based Remote Sensing for Arms Control Verification", External Affairs, Canada, *Verification Brochures* no. 2, 1987.

Table XI

PAXSAT SATELLITE MISSION OPERATION/TECHNIQUES' TRADE-OFFS

MISSION OPERATION TECHNIQUES	Response Time	Approach/ Tracking Procedures	Period of Satellite's Field of View	Detection/Identification of On-Board Equipments§			Fuel§§ Consumption
				Power Capabilities¶	Communication Capabilities¶¶	Remote Sensing Systems Capabilities¶¶¶	
GROUND-BASED SATELLITES • Launching of PAXSAT satellites	Slow	Rendez-vous; Station keeping.	Long	High/High	High/High	High/High	Low
SPACE-BASED SATELLITES • Fly by of PAXSAT satellites based on intersecting orbits	Fast	No rendez-vous; No station keeping.	Brief	Low/Low	Low/Low	Low/Low	Low
• Co-orbit by manoeuvring PAXSAT satellites positioned in a parking orbit	Fast	Rendez-vous; Station keeping.	Long	High/High	High/High	High/High	High

¶= Propulsion capabilities: shape and power magnitude, radiation emitted; ¶¶= Frequency band, data rate, operation cycle, radiated power; ¶¶¶= Optical imaging; infra-red imaging, antenna apertures; §= PAXSAT satellites' detection and identification capabilities may vary according to their orbital planes, approach/tracking procedures employed, as well as the orbital plane and manoeuvres of the space object targeted; §§= High fuel consumption affects successive PAXSAT missions since the among of fuel available determines spacecraft lifetime and the volume of space a given satellite can probe.

Source: Compiled from data given in "PAXSAT Concept: The Application of Space-Based Remote Sensing for Arms Control Verification", External Affairs, Canada, *Verification Brochures* no. 2, 1987; F.R. Cleminson, "PAXSAT and Progress in Arms Control," *Space Policy*, May 1988, pp. 97-102 ; F.J.F. Osborne, "The PAXSAT Concept: A Study of Space to Space Remote Sensing," in *A Proxy for Trust: Views on the Verification Issue in Arms Control and Disarmament Negotiations*, (John O'Manique, Ed.), Ottawa: The Norman Paterson School of International Affairs, pp. 89-100; and others.

determine the functions of a particular space object would be performed by PAXSAT satellite's various sensors which could include a visible light imaging system, a thermal imaging system, a communication signal-measurement receiver, and radiation and chemical sensors.[30] Table XI illustrates general PAXSAT satellite mission operation/techniques' trade-offs which would influence the construction of PAXSAT satellites and their utilization. The data collected by PAXSAT satellites, which would be subject to measures to ensure confidentiality, would transit through the Data Acquisition Centre(s) and Data Processing Centre(s) where data-interpretation experts would analyze and transmit the results to the Consultative Authority requesting the verification.

Another important aspect of the PAXSAT system is that it is not intended to replace any verification mechanism of any given treaty, but will become an additional element in overall verification process of a treaty. The concept, whose technology requirements are to be met collectively by participants, is said to be conceived in such a way as to avoid costly major investment, particularly as its research phase is based on openly available technology of meteorological and remote-sensing satellites from the Canadian space industry. However, it was estimated in 1987 that the cost of the PAXSAT system would be in the magnitude of several billions of dollars.[31] But any figure advanced is likely to be highly speculative and liable to major fluctuation. An operational PAXSAT A system would have to fulfil a number of specific requirements in verifying a particular outer space treaty so that the design of the satellites required and their technological components, frequency of operations, and orbital pass would dictate the magnitude of financial investment involved.[32]

Reactions in the CD to the Canadian concept have, overall, been quite positive and a number of delegations have urged further elaboration of PAXSAT, particularly its space-to-space applications.[33] There is growing consensus that the French, Soviet and Canadian proposals are not competitive, but complementary, at least as far as their principal objectives and functions are concerned.[34] However, no proposal to combine these three concepts into a single instrument ensuring space-to-Earth and space-to-space observation and on-site inspections has yet been advanced, nor indeed has there been an in-depth discussion as to whether such a combined system would be feasible or politically desirable. Accordingly, no further action has been taken in this direction either.

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[30] *Loc. cit.*

[31] CD/773, *Op. cit.*, p. 4 (Canada).

[32] For further discussion concerning payload characteristics (including the conceptual design of a PAXSAT spacecraft) and the performance of PAXSAT satellites, see Osborne, *Op. cit.*, pp. 93-100.

[33] See CD/PV 423, *Op. cit.*, p. 19 (China); CD/PV 516, *Op. cit.*, p. 19 (Sweden); and CD/905 *Op. cit.*, pp. 21-22 (Mongolia) for examples of statements made in the *Ad Hoc* Committee.

[34] See CD/905, *Op. cit.*, 21 (Mongolia); "Statement submitted by Czechoslovakia to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 418, 2 July 1987, p. 12; CD/PV 425, *Op. cit.*, 14 (GDR); "Statement submitted by the German Democratic Republic to the Conference on Disarmament", *Conference on Disarmament*, CD/PV 514, 4 July 1989, p. 9.

Summary

and

Future Initiatives

SUMMARY

PART I: MILITARY SPACE ACTIVITIES AND THEIR LEGAL LIMITATION

PART I - CHAPTER I: The Need for Security in Outer Space

A prerequisite to the drafting of any agreement on the prevention of an arms race in space is a comprehensive assessment of military and military-related activity in that environment. Equally important, as delegations to the Conference on Disarmament and its subsidiary body, the *Ad Hoc* PAROS Committee, have stressed on numerous occasions, is the need to reach agreement on the interpretation of such key terms as space object, boundary of outer space, peaceful uses of outer space, militarization of outer space, and space weapons, and space weapon systems. A few delegations have tabled suggested definitions for space weapons and ASAT weapons, but a definition for outer space and its boundary with air space has not yet been discussed in depth. Nevertheless, it is a majority view that agreed definitions of these key terms would constitute significant progress towards the negotiation of an agreement on the prevention of an arms race in outer space.

Most delegations are of the opinion that outer space has been and is being used for military purposes, if only by the placement of military satellites and dual-purpose civilian satellites into orbit. However, while it is generally thought that dedicated space-based weapons and weapon systems are not orbiting outer space at present, there is growing concern about R&D on ballistic missile defense as well as the emergence of doctrines sustaining a major role for space in the event of a military conflict. It is argued these factors could have serious repercussions on the weapons-free status of outer space.

Other related issues include the relationship between bilateral and multilateral efforts on arms limitation in or concerned with outer space. Some of the major space-capable delegations subscribe to the view that the Soviet/USA bilateral talks are closely connected to multilateral issues. They also believe that multilateral progress is dependent on bilateral progress. While it may be said that there is general agreement among delegations to the CD on the special responsibility of the Soviet Union and the United States in matters affecting outer space security, there is also a general belief that bilateral efforts are and should be complementary to multilateral negotiations.

PART I - CHAPTER II: Legal Status of Military Activities in Outer Space

That an important element in the Conference on Disarmament's work is the legal status of military activities in outer space may be seen from the fact that the *Ad Hoc* PAROS Committee has actually been mandated to undertake a comprehensive review of positive law as it relates to outer space. At least one delegation has argued that the present régime is adequate as far as the military issues are concerned, but many others believe that, while the Outer Space Treaty, the Partial Test Ban Treaty, and the ABM

Treaty do limit the military use of outer space, they have not completely sealed off all possibility of an arms race in that environment. Accordingly, most delegations have turned their attention to (1) the need for factual reports on individual national interpretations of international treaties and the military use of outer space, and (2) the need for careful follow-up of any kind of military activity in outer space which is not prohibited, especially the testing, deployment, and use of certain types of weapons.

Most delegations agree on the need to reinforce the positive law of outer space and to prevent the weaponization of that environment. Discussions on ways of reinforcing this régime include, *inter alia*, the adaptation of existing provisions to meet new and projected requirements in space capable-weaponry. It has been said that such a step would help change the perception many States have as to the exact role any given agreement can play in a legal régime. This would be particularly true of those agreements which have so far been considered as being on the fringe of arms limitation agreements related to outer space (e.g., the Registration Convention), but which could in fact be integrated into that legal spectrum of arms limitation and thus become part of the confidence-building process in view of preventing an arms race in outer space. Discussions have also cover the fact that several major and emerging space-capable powers have failed to ratify or adhere to all the existing treaties and agreements on outer space. In this connection, it is generally felt that the prevention of an arms race in outer space will have taken a significant step forward if these powers were to do adhere to the said treaties.

Another possible way of reinforcing the present régime is to draft new instruments, but consensus has not yet been reached at the CD as to whether there should be a comprehensive régime on outer space or whether there should be a series of weapon-specific treaties. Whatever the outcome of the CD's discussions on this point, the ultimate goal of the *Ad Hoc* PAROS Committee is to address the entire spectrum of the existing legal régime on outer space. Since it may be of interest to know which activities are actually covered by present space law among contracting parties of both bilateral and multilateral international agreements and treaties, a recapitulation is presented in Table XII* showing the type of military activity which could potentially affect outer space, the moon, and other celestial bodies; whether the status of such activity is limited or prohibited; and the existence of verification machinery. The Table also highlights the principal areas in which the Committee is expected to focus its attention in the further development of international public law on outer space.

* It should be noted that some limitations or prohibitions presented in Table XII, such as the threat or use of force, are inscribed in the UN Charter. In addition, some limitations or prohibitions are considered by several delegations to the CD to be customary international law equally binding on all States. Because of the diverse positions advocated by different delegations, the Table *cannot* represent the agreed position of any country. Therefore, the Table simply reflects a view that has been expressed by many delegations as to how certain military activities related to outer space could be interpreted.

TABLE XII

Legal Status of Military-Related Activities in Outer Space, and on the Moon and Other Celestial Bodies

WEAPONS, WEAPON SYSTEMS, OR MILITARY ACTIVITIES	TYPE OF ENVIRONMENT OR PLATFORM		
	Outer Space§	Moon and Other Celestial bodies in general§§	Other Celestial bodies within the solar system§§
- Registration of the launching of space objects	(M)	(M)	(M)
•• Scope	Limited information	Limited information	Limited information
•• Timing	Not clearly defined	Not clearly defined	Not clearly defined
• Threat or use of force§§§	Controversial (M)	Prohibited (M)	Prohibited (M)
• Use of satellite for military purposes	Not prohibited	Not prohibited	Not prohibited
• Interference with Satellites			
•• Reconnaissance	Prohibited (B¶/M)	Controversial (M)¶¶	Controversial (M)¶¶
•• Communications	Prohibited (B¶/M)	Controversial (M)¶¶	Controversial (M)¶¶
•• Early Warning	Prohibited (B¶/M)	Controversial (M)¶¶	Controversial (M)¶¶
•• Others	Controversial (M)¶¶	Controversial (M)¶¶	Controversial (M)¶¶
• Military activities			
•• Establishment of military bases	Not prohibited	Prohibited (M)	Prohibited (M)
•• Installations and fortifications	Not prohibited	Prohibited (M)	Prohibited (M)
•• Military manoeuvres	Not prohibited	Prohibited (M)	Prohibited (M)
• Testing of weapons or weapon systems			
•• Nuclear	Prohibited (M)	Prohibited (M)	Prohibited (M)
•• Other weapons of mass destruction	Not prohibited	Prohibited (M)	Prohibited (M)
•• Conventional weapons	Not prohibited¶¶	Prohibited (M)	Prohibited (M)
•• Directed energy weapons	Controversial (B)	Prohibited (M)	Prohibited (M)
- Placing of weapons/weapon systems in orbit			
•• Nuclear	Prohibited (M)	Prohibited (M)	Prohibited (M)
•• Other weapons of mass destruction	Prohibited (M)	Prohibited (M)	Prohibited (M)
•• Conventional weapons	Not prohibited	Prohibited (M)¶¶¶	Prohibited (M)¶¶¶
•• Directed energy weapons	Controversial (B)	Prohibited (M)¶¶¶	Prohibited (M)¶¶¶
- Military or any other hostile use of environmental modification techniques	Prohibited (M)	Prohibited (M)¶¶¶	Prohibited (M)¶¶¶
• Use of weapons or weapon systems			
•• Nuclear	Not prohibited¶¶	Prohibited (M)	Prohibited (M)
•• Other weapons of mass destruction	Prohibited (M)	Prohibited (M)	Prohibited (M)
•• Conventional weapons	Not prohibited¶¶	Prohibited (M)¶¶¶¶	Prohibited (M)¶¶¶¶
•• Directed energy weapons	Not prohibited¶¶	Prohibited (M)¶¶¶¶	Prohibited (M)¶¶¶¶
- Verification procedures			
•• Registration of the launching of space objects	Non-existent	Non-existent	Non-existent
•• Threat or use of force	Non-existent	Non-existent	Non-existent
•• Use of satellite for military purposes	Non-existent	Non-existent	Non-existent
•• Interference with satellites	Consultations (B)	Non-existent	Non-existent
•• Military activities and bases	Non-existent	Reciprocal basis (M)	Reciprocal basis (M)
•• Testing of weapons or weapon systems	Non-existent	Voluntary basis (M)	Voluntary basis (M)
•• Placing of weapons or weapon systems in orbit (including launching)	Voluntary basis (M)	Reciprocal basis (M)	Reciprocal basis (M)
•• Environmental modification	Cooperative basis (M)	Cooperative basis (M)	Cooperative basis(M)
•• Use of weapons/weapon systems	Non-existent	Mandatory basis (M)	Mandatory basis (M)

§= Space between celestial bodies, including Earth orbit; §§= Including around or other trajectory to; §§§= According to Article 2, paragraph 4 of the UN Charter; ¶= Implicit and explicit prohibition. Includes agreements no longer in force that the Soviet Union and the United States have announced they will continue to observe; ¶¶= However, rules of conduct regarding the threat or use of force do exist; ¶¶¶= Prohibition is not explicit and refers to any threat or use of force or any other hostile act or threat of hostile act; ¶¶¶¶= Prohibition stipulates the use of this environment exclusively for peaceful purposes; **B**= Bilateral Agreement/Treaty; **M**= Multilateral Agreement/Treaty; **Controversial**= Subject of considerable debate among delegations.

PART II: PREVENTION OF AN ARMS RACE IN OUTER SPACE

PART II - CHAPTER I: Proposals Related to Existing Agreements

A number of drafts of new treaties as well as several amendments to the Outer Space Treaty and the Registration Convention in the form of additional Articles and/or Protocols have been proposed and discussed at the CD in the past decade. In addition, there have also been discussions on the possible multilaterization of the ABM Treaty. Accordingly, the main areas of interest of these various proposals have been grouped in Table XIII below.

Table XIII

Main Proposals Related to Existing Agreements on Outer Space

LEGAL INSTRUMENT	PROPOSALS		
	Amendment	Additional Protocol	New Treaty
• Outer Space Treaty	**Article 4** - introduction of new term "or any type of space weapon"; - new para. banning development, production, storage or use of space weapons; - extension of the ban on nuclear weapons and weapons of mass destruction to "other kinds of weapon that could be conceived for use in space, from space, or into space".	**Article 4** - outer space shall be used for peaceful purposes only; - prohibition of launching/ stationing into Earth orbit, and testing, of any type of device designed for offensive purposes; - prohibition of Earth-based ASAT weapons (whatever their nature). **Articles IX to XII** - supplementary provisions.	-
• Registration Convention	**Article 4** - increase transparency in space and space related activities: – more-definable timing for reporting the launching of objects into space; – more-stringent reports on the functions of object to be launched into space. — multilateral exchange of data on the military functions of space objects; – proposal for States not party to the Convention to report the launching of objects into space in pursuance of resolution GA/1721. - establishment of verification clauses: – on-site inspections.		-
• ABM Treaty		- regulation of advanced space or space-related technology.	- multilateralize and supplement the ABM Treaty, including: – interpretation on permissible research; – ban on ASAT weapons. - confidence-building measures.

PART II - CHAPTER II: Proposals for a New Agreement

The *Ad Hoc* PAROS Committee has considered a number of new draft proposals on the prohibition of space weapon hardware and on the use of force in outer space. Since initiatives offering a practical impact on the prevention of an arms race in outer space always find a large measure of support, much effort has been made to draw up the main features of a treaty on ASAT weapons and ASAT activity. At the same time, consideration has also been given to the question of the immunity of Earth-orbiting objects. This does not, strictly speaking, apply to ASAT weapons as such, but to their use and, consequently, a possible threat or use of force in outer space.

The major initiatives regarding ASAT weapons and the immunity of space objects have been:

- Prohibition of the threat or use of force against space objects;
- Prohibition of any space or Earth-based weapon intended for the use against space objects;
- Prohibition of the use of any space object as means to destroy, damage, or disturb the normal functioning or the flight trajectory of space objects of other States;
- Proscribe the development, production, or deployment of ASAT weapons.
- Granting of immunity to certain or all space objects.

Two further proposals have been the destruction of dedicated ASAT weapons and the prohibition of any activity with non-dedicated ASAT weapons, two areas which are reportedly delicate to negotiate in view of the difficulty in enforcing compliance. Thus, no agreement has yet been reached on whether immunity should be extended to all objects or only some, nor indeed whether the CD is the appropriate forum to negotiate a treaty on the legal immunity of space objects.

PART II - CHAPTER III: Proposals on Confidence-Building Measures (CBMs)

In view of the fact that several delegations feel that the time is not yet ripe for full-scale negotiations on measures of a strict arms limitation nature, there is increasing interest in achieving more transparency in space activity, since many believe that this would constitute a constructive move towards the prevention of an arms race in outer space. Accordingly, a number of new measures have been advanced to foster the dissemination of knowledge on the various technical problems and to prepare the political basis for negotiations proper.

While some of the measures proposed are designed on a voluntary/reciprocal basis, other measures involve contractual obligations. Among the major proposals are, in particular, the concepts of a *space code of conduct* and *open outer space*. In addition, the French delegation has tabled a proposal for the creation of an international trajectography centre, to monitor the trajectory of space objects. The creation of such a

centre is often said to be a constructive step which could help avoid incidents in outer space while contributing to efforts aimed at promoting the immunity of satellites. France has also proposed the establishment of a satellite image processing agency, which would process remote sensing data for crisis control, the prevention of natural disasters, and the implementation of development programmes and of disarmament agreements.

PART II - CHAPTER IV: Possible Institutional Arrangements

Discussions in this area have highlighted the fact that monitoring and verifying any agreement on outer space would require various procedures such as on-site ground inspection before objects are launched into space and the remote observation and detection of orbiting space objects. Proposals tabled so far have mostly been based on the monitoring of existing arms limitation agreements, and CD discussions have frequently referred to the *International Satellite Monitoring Agency* (ISMA) proposed by France in 1978 to the *United Nations Special Session on Disarmament* (UNSSODI). The Soviet proposal presented in 1988 for the establishment of an *International Space Monitoring Agency* (ISMA) has also received careful attention.

With regard to the verification of arms limitation and disarmament, the CD has considered a 1988 Soviet proposal suggesting the creation of an *International Space Inspectorate* (ISI) to verify the non-placement of weapons of any kind in outer space, which laid down a basic structure for permanent *in situ* inspections of launch sites. Also considered was PAXSAT, a Canadian space-to-space verification concept. The general opinion was that all of the proposals mentioned above complement each other. Table XIV below shows the main features of proposed institutional arrangements revealing their similarities and distinctions. It is thought that although such institutional arrangements may collectively fulfil the verification needs of a treaty on outer space, other measures, e.g., satellite-tracking with ground devices should also be examined.

Table XIV

PROPOSALS AND CONCEPTS FOR THE MONITORING AND VERIFICATION OF ARMS LIMITATION AND DISARMAMENT AGREEMENTS RELATED TO OUTER SPACE

FEATURE	POSSIBLE INSTITUTIONAL ARRANGEMENTS			
	ISMA French 1978	PAXSAT A Canada 1986	ISI Soviet Union 1988	ISMA Soviet Union 1988
• Type	Proposal.	Concept	Proposal	Proposal
• Scope	Global: existing and future treaties (unlimited number of treaties covering any type of weapon and weapons system).	Treaty specific on the PAROS (unlimited number of treaties).	Specific treaty on the PAROS: prohibiting the placement of weapons of any kind in outer space.	Global: existing and future treaties (unlimited number of treaties covering any type of weapon and weapons system).
• Objective	Monitoring; Verification (under special arrangements).	Verification (under special arrangements).	Verification.	Monitoring; Verification (under special arrangements).
• Application - monitoring and/ or verification (as applicable):	Arms limitation and disarmament; RIOs dealing with security issues; Settlement of disputes.	Arms limitation and disarmament.	Arms limitation and disarmament.	Arms limitation and disarmament; RIOs dealing with security issues; Confidence-Building Measures; Settlement of disputes; Natural disasters; Other emergencies.
• Method	Remote sensing (space-to-Earth).¶	Remote sensing (space-to-space)	On-site.	Remote sensing (space-to-Earth).¶
• Function	NTMs; ISMA satellites.	PAXSAT satellites (NTMs of contracting parties may contribute some data).	Permanent inspection teams; *Ad Hoc* inspection teams.	NTMs; Possibility of ISMA satellites.
• Output	Supply of satellite monitoring/ verification data.	Supply of satellite verification data.	Treaty specific verification.	Supply of satellite monitoring/ verification data.

¶= Includes space-to-ground, space-to-air, and space-to-sea observations; **French ISMA**= International Satellite Monitoring Agency; **PAXSAT**= Peace Satellite; **ISI**= International Space Inspectorate; **Soviet ISMA**= International Space Monitoring Agency; **PAROS**= Prevention of an Arms Race in Outer Space; **RIOs**= Regional International Organizations; **NTMs**= National Technical Means

FUTURE INITIATIVES

It is abundantly clear from the fore-going summary that discussion at the CD and its subsidiary *Ad Hoc* PAROS Committee has been far from inconsequential in the past decade. However, future effort will probably include a reassessment of the crucial questions requiring further elaboration, such as:

■ DEFINITIONS

- Collectively agreed definitions of the following key terms when used for the purpose of negotiations:
  - outer space;
  - military uses of outer space;
  - space weapons;
  - ASAT systems;
  - what constitues an arms race in outer space.

■ THREAT OR USE OF FORCE

- What constitutes a threat in relation to activities in outer space?
- What constitutes legitimate self-defence in relation to activities in outer space?

■ ASAT BAN AND/OR IMMUNITY OF SATELLITES

- What constitutes impingement on the operation of satellites?
- What are the criteria for designating interference with satellites as *unintentional*?
- Is it necessary to grant a satellite total immunity, or would it suffice to confer immunity on one or more of its functions?
- In the absence of total immunity, what status would a satellite have and what effect would this have on the prevention of an arms race in outer space?

■ CONFIDENCE-BUILDING MEASURES

- How should efforts to improve confidence and increase transparency among States be pursued?
  - voluntary initiatives;
  - contractual obligations;
  - a combination of these.

■ VERIFICATION

- What type of verification is appropriate and feasible for an agreement on the prevention of an arms race in outer space?
- Would it be necessary, desirable, or feasible to combine the main features of existing proposals and concepts to verify such an agreement?
- How could a satellite originally deployed to verify arms limitation and disarmament be prevented from being used for other, i.e., military, purposes?

■ STRUCTURE OF FUTURE NEGOTIATIONS

- Which issues fall squarely within the purview and competence of the CD?
- Is there agreement on the priority to be assigned to negotiations?

  - threat or use of force in outer space;
  - partial or comprehensive ASAT ban;
  - partial or total immunity of satellites;
  - comprehensive outer space régime.

The lack of agreement on the basic criteria has given rise to concern about the mandate of the *Ad Hoc* PAROS Committee for its annual deliberations. Some delegations argue that the Committee's mandate presently provides insufficient room to reach meaningful concordance on definitions and other issues. The question of how long the Committee should continue to improve collective technical and legal knowledge of the issues related to the prevention of arms race in outer space before undertaking negotiations will also have to be resolved. Should there be consensus on some, the majority, or all of the issues in question before further steps can be taken? In seeking answers to these questions, delegations to the CD will doubtless examine whether the present mandate of the *Ad Hoc* PAROS Committee is commensurate to the task of preventing an arms race in outer space, and whether, in the light of developments in space weaponry, the work of the Committee is not lagging behind the development of military space technology (the latter would naturally affect the efforts undertaken at the Committee itself).

Annex,

Glossary,

Bibliography,

Index,

and

UNIDIR Publications

ANNEX A

Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies*

OPEN FOR SIGNATURE AT LONDON, MOSCOW AND WASHINGTON: 27 JANUARY 1967
ENTERED INTO FORCE: 10 OCTOBER 1967
DEPOSITARY GOVERNMENTS: Union of Soviet Socialist Republics, United Kingdom of Great Britain and Northern Ireland and United States of America

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The States Parties to the Treaty,

Inspired by the great prospects opening up before mankind as a result of man's entry into outer space,

Recognizing the common interest of all mankind in the progress of the exploration and use of outer space for peaceful purposes,

Believing that the exploration and use of outer space should be carried on for the benefit of all peoples irrespective of the degree of their economic or scientific development,

Desiring to contribute to broad international co-operation in the scientific as well as the legal aspects of the exploration and use of outer space for peaceful purposes,

Believing that such co-operation will contribute to the development of mutual understanding and to the strengthening of friendly relations between States and peoples,

Recalling resolution 1962 (XVII), entitled "Declaration of Legal Principles Governing the Activities of States in the Exploration and Use of Outer Space", which was adopted unanimously by the United Nations General Assembly on 13 December 1963,

Recalling resolution 1884 (XVIII), calling upon States to refrain from placing in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction or from installing such weapons on celestial bodies, which was adopted unanimously by the United Nations General Assembly on 17 October 1963,

Taking account of united Nations General Assembly resolution 110 (II) of 3 November 1947, which condemned propaganda designed or likely to promote or encourage any threat to peace, breach of the peace or act of aggression, and considering that the aforementioned resolution is applicable to outer space,

Convinced that a Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, will further the Purposes and Principles of the Charter of the United Nations,

Have agreed on the following:

Article I

The exploration and use of outer space, including the moon and other celestial bodies, shall be carried out for the benefit and in the interest of all countries, irrespective of their degree of economic or scientific development, and shall be the province of all mankind.

Outer space, including the moon and other celestial bodies, shall be free for exploration and use by all States without discrimination of any kind, on a basis of equality and in accordance with international law, and there shall be free access to all areas of celestial bodies.

There shall be freedom of scientific investigation in outer space, including the moon and other celestial bodies, and States shall facilitate and encourage international co-operation in such investigation.

Article II

Outer space, including the moon and other celestial bodies, is not subject to national appropriation by claim of sovereignty, by means of use or occupation, or by any other means.

Article III

States Parties to the Treaty shall carry on activities in the exploration and use of outer space, including the moon and other celestial bodies, in accordance with international law, including the Charter of the United Nations, in the interest of maintaining international peace and security and promoting international co-operation and understanding.

Article IV

States Parties to the Treaty undertake not to place in orbit around the earth any objects carrying nuclear weapons or any other kinds of weapons of mass destruction, install such weapons on celestial bodies, or station such weapons in outer space in any other manner.

The moon and other celestial bodies shall be used by all States Parties to the Treaty exclusively for peaceful purposes. The establishment of military bases, installations and fortifications, the testing of any type of weapons and the conduct of military manoeuvres on celestial bodies shall be forbidden. The use of military personnel for scientific research or for any other peaceful purposes shall not be prohibited. The use of any equipment or facility necessary for peaceful exploration of the moon and other celestial bodies shall also not be prohibited.

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* *Official Records of the General Assembly*, A/RES/2222 (XXI), Annex, 19 December 1966.

Article V

States Parties to the Treaty shall regard astronauts as envoys of mankind in outer space and shall render to them all possible assistance in the event of accident, distress, or emergency landing on the territory of another State Party or on the high seas. When astronauts make such a landing, they shall be safely and promptly returned to the State of registry of their space vehicle.

In carrying on activities in outer space and on celestial bodies, the astronauts of one State Party shall render all possible assistance to the astronauts of the other State Parties.

State Parties to the Treaty shall immediately inform the other States Parties to the Treaty or the Secretary-General of the United Nations of any phenomena they discover in outer space, including the moon and other celestial bodies, which could constitute a danger to the life of health of astronauts.

Article VI

States Parties to the Treaty shall bear international responsibility for national activities in outer space, including the moon and other celestial bodies, whether such activities are carried on by governmental agencies or by non-governmental entities, and for assuring that national activities are carried out in conformity with the provisions set forth in the present Treaty. The activities of non-governmental entities in outer space, including the moon and other celestial bodies, shall require authorization and continuing supervision by the appropriate State Party to the Treaty. When activities are carried on in outer space, including the moon and other celestial bodies, by an international organization, responsibility for compliance with this Treaty shall be borne both by the international organization and by the States Parties to the Treaty participating in such organization.

Article VII

Each State Party to the Treaty that launches or procures the launching of an object into outer space, including the moon and other celestial bodies, and each State Party from whose territory or facility an object is launched, is internationally liable for damage to another State Party to the Treaty or to its natural or juridical persons by such object or its component parts on the Earth, in air space or in outer space, including the moon and other celestial bodies.

Article VIII

A State Party to the Treaty on whose registry an object launched into outer space is carried shall retain jurisdiction and control over such object, and over any personnel thereof, while in outer space or on a celestial body. Ownership of objects launched into outer space, including objects landed or constructed on a celestial body, and of their component parts, is not affected by their presence in outer space or on a celestial body or by their return to the Earth. Such objects or component parts found beyond the limits of the State Party to the Treaty on whose registry they are carried shall be returned to that State Party, which shall, upon request, furnish identifying data prior to their return.

Article IX

In the exploration and use of outer space, including the moon and other celestial bodies, States Parties to the Treaty shall be guided by the principle of co-operation and mutual assistance and shall conduct all their activities in outer space, including the moon and other celestial bodies, with due regard to the corresponding interests of all other States Parties to the Treaty. States Parties to the Treaty shall pursue studies of outer space, including the moon and other celestial bodies, and conduct exploration of them so as to avoid their harmful contamination and also adverse changes in the environment of the Earth resulting from the introduction of extraterrestrial matter and, where necessary, shall adopt appropriate measures for this purpose. If a State Party of the Treaty has reason to believe that an activity or experiment planned by it or its nationals in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities of other States Parties in the peaceful exploration and use of outer space, including the moon and other celestial bodies, it shall undertake appropriate international consultations before proceeding with any such activity or experiment. A State Party to the Treaty which has reason to believe that an activity or experiment planned by another State Party in outer space, including the moon and other celestial bodies, would cause potentially harmful interference with activities in the peaceful exploration and use of outer space, including the moon and other celestial bodies, may request consultation concerning the activity or experiment.

Article X

In order to promote international co-operation in the exploration and use of outer space, including the moon and other celestial bodies, in conformity with the purposes of this Treaty, the States Parties to the Treaty shall consider on a basis of equality any requests by other States Parties to the Treaty to be afforded an opportunity to observe the flight of space objects launched by those States.

The nature of such an opportunity for observation and the conditions under which it could be afforded shall be determined by agreement between the States concerned.

Article XI

In order to promote international co-operation in the peaceful exploration and use of outer space, States Parties to the Treaty conducting activities in outer space, including the moon and other celestial bodies, agree to inform the Secretary-General of the United Nations as well as the public and the international scientific community, to the greatest extent feasible and practicable, of the nature, conduct, locations and results of such activities. On receiving the said information, the Secretary-General of the United Nations should be prepared to disseminate it immediately and effectively.

Article XII

All stations, installations, equipment and space vehicles on the moon and other celestial bodies shall be open to representatives of other States Parties to the Treaty on a basis of reciprocity. Such representatives shall give reasonable advance notice of a projected visit, in order that appropriate consultations may be held and that maximum

precautions may be taken to assure safety and to avoid interference with normal operations in the facility to be visited.

Article XIII

The provisions of this treaty shall apply to the activities of States Parties to the Treaty in the exploration and use of outer space, including the moon and other celestial bodies; whether such activities are carried on by a single State Party to the Treaty or jointly with other States, including cases where they are carried on within the framework of international inter-governmental organizations.

Any practical questions arising in connection with activities carried on by international inter-governmental organizations in the exploration and use of outer space, including the moon and other celestial bodies, shall be resolved by the States Parties to the Treaty either with the appropriate international organization or with one or more States members of that international organization, which are Parties to this Treaty.

Article XIV

1. This Treaty shall be open to all States for signature. Any State which does not sign this Treaty before its entry into force in accordance with paragraph 3 of this Article may accede to it at any time.

2. This Treaty shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Governments of the United Kingdom of Great Britain and Northern Ireland, the Union of Soviet Socialist Republics and the United States of America, which are hereby designed the Depositary Governments.

3. This Treaty shall enter into force upon the deposit of instruments or ratification by five Governments including the Governments designed as Depositary Governments under this Treaty.

4. For States whose instruments of ratification or accession are deposited subsequently to the entry into force of this Treaty, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Depository Governments shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification of and accession to this Treaty, the date of its entry into force and other notices.

6. This Treaty shall be registered by the Depositary Governments pursuant to Article 102 of the Charter of the United Nations.

Article XV

Any State Party to the Treaty may propose amendments to this Treaty. Amendments shall enter into force for each State Party to the Treaty accepting the amendments upon their acceptance by a majority of the States parties to the Treaty and thereafter for each remaining State Party to the Treaty on the date of acceptance by it.

Article XVI

Any State Party to the Treaty may give notice of its withdrawal from the Treaty one year after its entry into force by written notification to the Depositary Governments. Such withdrawal shall take effect one year from the date of receipt of this notification.

Article XVII

This Treaty, of which the English, Russian, French, Spanish and Chinese texts are equally authentic, shall be deposited in the archives of the Depositary Governments. Duly certified copies of this Treaty shall be transmitted by the Depositary Governments to the Governments of the signatory and acceding States.

IN WITNESS WHEREOF the undersigned, duly authorized, have signed this Treaty.

Done in ....., at the cities of London, Moscow and Washington, the ....., one thousand nine hundred and ..... .

ANNEX B

Convention on Registration of Objects Launched into Outer Space*

The States Parties to this Convention,

Recognizing the common interest of all mankind in furthering the exploration and use of outer space for peaceful purposes,

Recalling that the Treaty on Principles Governing the Activities of States in Outer Space, including the Moon and Other Celestial Bodies of 27 January 1967 affirms that States shall bear international responsibility for their national activities in outer space and refers to the State on whose registry an object launched into outer space is carried,

Recalling also that the Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space of 22 April 1968 provides that a launching authority shall, upon request, furnish identifying data prior to the return of an object it has launched into outer space found beyond the territorial limits of the launching authority,

Recalling further that the Convention on International Liability for Damage Caused by Space Objects of 29 March 1972 establishes international rules and procedures concerning the liability of launching States for damage caused by their space objects,

Desiring, in the light of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, to make provision for the national registration by launching States of space objects launched into outer space,

Desiring further that a central register of objects launched into outer space be established and maintained, on a mandatory basis, by the Secretary-General of the United Nations,

Desiring also to provide for States Parties additional means and procedures to assist in the identification of space objects,

Believing that a mandatory system of registering objects launched into outer space would, in particular, assist in their identification and would contribute to the application and development of international law governing the exploration and use of outer space,

Have agreed on the following:

ARTICLE I

For the purposes of this Convention:

(*a*) The term "launching State" means:

(i) A State which launches or procures the launching of a space objects;

(ii) A State from whose territory or facility a space object is launched;

(*b*) The term "space object" includes component parts of a space object as well as its launch vehicle and parts thereof;

(*c*) The term "State of registry" means a launching State on whose registry a space object is carried in accordance with article II.

ARTICLE II

1. When a space object is launched into earth orbit or beyond, the launching State shall register the space object by means of an entry in an appropriate registry which it shall maintain. Each launching State shall inform the Secretary-General of the United Nations of the establishment of such a registry.

2. Where there are two or more launching States in respect of any such space object, they shall jointly determine which one of them shall register the object in accordance with paragraph 1 of this article, bearing in mind the provisions of article VIII of the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies, and without prejudice to appropriate agreements concluded or to be concluded among the launching States on Jurisdiction and control over the space object and over any personnel thereof.

ARTICLE III

1. The Secretary-General of the United Nations shall maintain a Register in which the information furnished in accordance with article IV shall be recorded.

2. There shall be full and open access to the information in this Register.

ARTICLE IV

1. Each State of registry shall furnish to the Secretary-General of the United Nations, as soon as practicable, the following information concerning each space object carried on its registry:

(*a*) Name of launching State or States;

(*b*) An appropriate designator of the space object or its registration number;

(*c*) Date and territory or location of launch;

(*d*) Basic orbital parameters, including:

(i) Nodal period,

(ii) Inclination,

(iii) Apogee,

(iv) Perigee;

(*e*) General function of the space object.

2. Each State of registry may, from time to time, provide the Secretary-General of the United Nations with additional information concerning a space object carried on its registry.

* *Official Records of the General Assembly*, A/RES/3235 (XXIX), Annex, 12 November 1974.

3. Each State of registry shall notify the Secretary-General of the United Nations, to the greatest extent feasible and as soon as practicable, of space objects concerning which it has previously transmitted information, and which have been but no longer are in earth orbit.

ARTICLE V

Whenever a space object launched into space orbit or beyond is marked with the designator or registration number referred to in article IV, paragraph 1 (*b*), or both, the State or registry shall notify the Secretary-General of this fact when submitting the information regarding the space object in accordance with article IV. In such case, the Secretary-General of the United Nations shall record this notification in the Register.

ARTICLE VI

Where the application of the provisions of this Convention has not enabled a State Party to identify a space object which has caused damage to it or to any of its natural or juridical persons, or which may be of hazardous or deleterious nature, other States Parties, including in particular States possessing space monitoring and tracking facilities, shall respond to the greatest extent feasible to a request by that State Party, or transmitted through the Secretary-General on its behalf, for assistance under equitable and reasonable conditions in the identification of the object. A State Party making such a request shall, to the greatest extent feasible, submit information as to the time, nature and circumstances of the events giving rise to the request. Arrangements under which such assistance shall be rendered shall be the subject of agreement between the parties concerned.

ARTICLE VII

1. In this Convention, with the exception of articles VIII to XII inclusive, references to State shall be deemed to apply to any international intergovernmental organization which conducts space activities if the organization declares its acceptance of the rights and obligations provided for in this Convention and if a majority of the States members of the organization are States Parties to this Convention and to the Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space, including the Moon and Other Celestial Bodies.

2. States members of any such organization which are States Parties to this Convention shall take all appropriate steps to ensure that the organization makes a declaration in accordance with paragraph 1 of this article.

ARTICLE VIII

1. This Convention shall be open for signature by all States at United Nations Headquarters in New York. Any State which does not sign this Convention before its entry into force in accordance with paragraph 3 of this article may accede to it at any time.

2. This Convention shall be subject to ratification by signatory States. Instruments of ratification and instruments of accession shall be deposited with the Secretary-General of the United Nations.

3. This Convention shall enter into force among the States which have deposited instruments of ratification on the deposit of the fifth such instrument with the Secretary-General of the United Nations.

4. For States whose instruments of ratification or accession are deposited subsequent to the entry into force of this Convention, it shall enter into force on the date of the deposit of their instruments of ratification or accession.

5. The Secretary-General shall promptly inform all signatory and acceding States of the date of each signature, the date of deposit of each instrument of ratification of and accession to this Convention, the date of its entry into force and other notices.

ARTICLE IX

Any State Party to this Convention may propose amendments to the Convention. Amendments shall enter into force for each State Party to the Convention accepting the amendment upon their acceptance by the majority of the States Parties to the Convention and thereafter for each remaining State Party to the Convention on the date of acceptance by it.

ARTICLE X

Ten years after the entry into force of this Convention, the question of the review of the Convention shall be included in the provisional agenda of the United Nations General Assembly in order to consider, in light of past application of the Convention, whether it requires revision. However, at any time after the Convention has been in force for five years, at the request of one third of the States Parties to the Convention and with the concurrence of the majority of the States Parties, a conference of the States Parties shall be convened to review this Convention. Such review shall take into account in particular any relevant technological developments, including those relating to the identification of space objects.

ARTICLE XI

Any State Party to this Convention may give notice of its withdrawal form the Convention one year after its entry into force by written notification to the Secretary-General of the United Nations. Such withdrawal shall take effect one year from the date of receipt of this notification.

ARTICLE XII

The original of this Convention, of which the Arabic, Chinese, English, French, Russian and Spanish texts are equally authentic, shall be deposited with the Secretary-General of the United Nations, who shall send certified copies thereof to all signatory and acceding States.

IN WITNESS WHEREOF the undersigned, being duly authorized thereto by their respective Governments, have signed this Convention, opened for signature at New York on 14 January 1975.

ANNEX C

Treaty Between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Missile Systems*

SIGNED AT MOSCOW MAY 26, 1972
INSTRUMENT OF RATIFICATION EXCHANGED OCTOBER 3, 1972
ENTERED INTO FORCE OCTOBER 3, 1972

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Proceeding from the premise that nuclear war would have devastating consequences for all mankind,

Considering that effective measures to limit anti-ballistic systems would be a substantial factor in curbing the race in strategic offensive arms and would lead to a decrease in the risk of outbreak of war involving nuclear weapons,

Proceeding from the premise that the limitation of anti-ballistic missiles systems, as well as certain agreed measures with respect to the limitation of strategic offensive arms, would contribute to the creation of more favorable conditions for further negotiations on limiting strategic arms,

Mindful of their obligations under Article VI of the Treaty on the Non-Proliferation of Nuclear Weapons,

Declaring their intention to achieve at the earliest possible date the cessation of the nuclear arms race and to take effective measures towards reductions in strategic arms, nuclear disarmament, and general and complete disarmament,

Desiring to contribute to the relaxation of international tension and the strengthening of trust between States,

Have agreed as follows:

Article I

1. Each Party undertakes to limit anti-ballistic missile (ABM) systems and to adopt other measures in accordance with the provisions of this Treaty.

2. Each Party undertakes not to deploy ABM systems for a defense of the territory of its country and not to provide a base for such a defense, and not to deploy ABM systems for defense of an individual region except as provided for in Article III of this Treaty.

Article II

1. For the purposes of this Treaty an ABM system is a system to counter strategic ballistic missiles or their elements in flight trajectory, currently consisting of:

(*a*) ABM interceptor missiles, which are interceptor missiles constructed and deployed for an ABM role, or of a type tested in an ABM mode;

(*b*) ABM launchers, which are launchers constructed and deployed for launching ABM interceptor missiles;

(*c*) ABM radars, which are radars constructed and deployed for ABM role, or of a type tested in an ABM mode.

2. The ABM system components listed in paragraph 1 of this Article include those which are:

(*a*) operational;
(*b*) under construction;
(*c*) undergoing testing;
(*d*) undergoing overhaul, repair, or conversion; or
(*e*) mothballed.

Article III

Each party undertakes not to deploy ABM systems or their components except that:

(*a*) within one ABM system deployment area having a radius of one hundred and fifty kilometres and centred on the Party's national capital, a Party may deploy: (1) no more than one hundred ABM launchers and no more than one hundred ABM interceptor missiles at launch sites, and (2) ABM radars within no more than six ABM radar complexes, the area of each complex being circular and having a diameter of no more than three kilometres; and

(*b*) within one ABM system deployment area having a radius of one hundred and fifty kilometres and containing ICBM silo launchers, a Party may deploy: (1) no more than one hundred ABM launchers and no more than one hundred ABM launchers and no more than one hundred ABM interceptor missiles at launch sites, (2) two large phased-array ABM radars comparable in potential to corresponding ABM radars operational or under construction on the date of signature of the Treaty in an ABM system deployment area containing ICBM silo launchers, and (3) no more than eighteen ABM radars each having a potential less than the potential of the smaller of the above-mentioned two large phased-array ABM radars.

Article IV

The limitations provided for in Article III shall not apply to ABM systems or their components used for development or testing, and located within current or additionally agreed test ranges. Each Party may have no more than a total of fifteen ABM launchers at test ranges.

* *Treaties and Other International Acts, Series* 7503, United States Department of States, Washington, D.C., 1973.

Article V

1. Each Party undertakes not to develop, test, or deploy ABM systems or components which are sea-based, air-based, space-based, or mobile land-based.

2. Each Party undertakes not to develop, test, or deploy ABM launchers for launching more than one ABM interceptor missile at a time from each launcher, nor to modify deployed launchers to provide them with such a capability, nor to develop, test, or deploy automatic or semi-automatic or other similar systems for rapid reload of ABM launchers.

Article VI

To enhance assurance of the effectiveness of the limitations on ABM systems and their components provided by this Treaty, each Party undertakes:

(*a*) not to give missiles, launchers, or radars, other than ABM interceptor missiles, ABM launchers, or ABM radars, capabilities to counter strategic ballistic missiles or their elements in flight trajectory, and not to test them in an ABM mode; and

(*b*) not to deploy in the future radars for early warning of strategic ballistic missile attack except at locations along the periphery of its national territory and oriented outward.

Article VII

Subject to the provisions of this Treaty, modernization and replacement of ABM systems or their components may be carried out.

Article VIII

ABM systems or their components in excess of the numbers or outside the areas specified in this Treaty, as well as ABM systems or their components prohibited by this Treaty, shall be destroyed or dismantled under agreed procedures within the shortest possible agreed period of time.

Article IX

To assure the viability and effectiveness of this Treaty, each Party undertakes not to transfer to other States, and not to deploy outside its national territory, ABM systems or their components limited by this Treaty.

Article X

Each Party undertakes not to assume any international obligations which would conflict with this Treaty.

Article XI

The Parties undertake to continue active negotiations for limitations on strategic offensive arms.

Article XII

1. For the purpose of providing assurance of compliance with the provisions of this Treaty, each Party shall use national technical means of verification at its disposal in a manner consistent with generally recognized principles of international law.

2. Each Party undertakes not to interfere with the national technical means of verification of the other Party operating in accordance with paragraph 1 of this Article.

3. Each Party undertakes not to use deliberate concealment measures which impede verification by national technical means of compliance with the provisions of this Treaty. This obligation shall not require changes in current construction, assembly, conversion, or overhaul practices.

Article XIII

1. To promote the objectives and implementation of the provisions of this Treaty, the Parties shall establish promptly a Standing Consultative Commission, within the framework of which they will:

(*a*) consider questions concerning compliance with the obligations assumed and related situations which may be considered ambiguous;

(*b*) provide on a voluntary basis such information as either Party considers necessary to assure confidence in compliance with the obligations assumed;

(*c*) consider questions involving unintended interference with national technical means of verification;

(*d*) consider possible changes in the strategic situation which have a bearing on the provisions of this Treaty;

(*e*) agree upon procedures and dates for destruction or dismantling of ABM systems or their components in cases provided for by the provisions of this Treaty;

(*f*) consider, as appropriate, possible proposals for further increasing the viability of this Treaty, including proposals for amendments in accordance with the provisions of this Treaty;

(*g*) consider, as appropriate, proposals for further measures aimed at limiting strategic arms.

2. The Parties through consultations shall establish, and may amend as appropriate, Regulations for the Standing Consultative Commission governing procedures, composition and other relevant matters.

Article XIV

1. Each Party may propose amendments to this Treaty. Agreed amendments shall enter into force in accordance with the procedures governing the entry into force of this Treaty.

2. Five years after entry into force of this Treaty, and at five year intervals thereafter, the Parties shall together conduct a review of this Treaty.

Article XV

1. This Treaty shall be of unlimited duration.

2. Each Party shall, in exercising its national sovereignty, have the right to withdraw from this Treaty if it decides that extraordinary events related to the subject matter of this Treaty have jeopardized its supreme interests. It shall give notice of its decision to the other Party six months prior to withdrawal from the Treaty. Such notice shall include a statement of the extraordinary events the notifying Party regards as having jeopardized its supreme interests.

Article XVI

1. This Treaty shall be subject to ratification in accordance with the constitutional procedures of each Party. The Treaty

shall enter into force on the day of the exchange of instruments of ratification.

2. This Treaty shall be registered pursuant to Article 102 of the Charter of the United Nations.

FOR THE UNITED STATES OF AMERICA
Richard Nixon
President of the United States of America

FOR THE UNION OF SOCIALIST REPUBLICS
L.I. Brezhnev
General Secretary of the Central Committee of the CPSU

AGREED INTERPRETATIONS AND UNILATERAL STATEMENTS REGARDING THE TREATY BETWEEN THE UNITED STATE OF AMERICA AND THE UNION OF SOVIET SOCIALIST REPUBLICS ON THE LIMITATION OF ANTI-BALLISTIC MISSILE SYSTEMS

1. Agreed interpretations

(*a*) *Initial Statements.* The document set forth below was agreed upon and initiated by the Heads of the Delegations on May 26, 1972:

[A]

The Parties undertake that, in addition to the ABM radars which may be deployed in accordance with subparagraph (*a*) of Article III of the Treaty, those non-phased-array ABM radars operational on the date of signature of the Treaty within the ABM system deployment area for defense of the national capital may be retained.

[B]

The Paries understand that the potential (the product of mean emitted power in watts and antenna are in square meters) of the smaller of the two large phased-array ABM radars referred to in subparagraph (*b*) of Article III of the Treaty is considered for purpose of the Treaty to be three million.

[C]

The Parties undertake that the centre of the ABM system deployment area centred on the national capital and the centre of the ABM system deployment area containing ICBM silo launches for each Party shall be separated by no less than thirteen hundred kilometres.

[D]

In order to insure fulfilment of the obligation not to deploy ABM systems and their components except as provided in Article III of the Treaty, the Parties agree that in the event ABM systems based on other physical principles and including components capable of substituting for ABM interceptor missiles, ABM launches, or ABM radars are created in the future, specific limitations on such systems and their components would be subject to discussion in accordance with Article XIII and agreement in accordance with Article XIV of the Treaty.

[E]

The Parties understand that Article V of the Treaty includes obligations not to develop, test or deploy ABM interceptor missiles for the delivery by each ABM interceptor missile of more than one independently guided warhead.

[F]

The Parties agree not to deploy phased-array radars having a potential (the product of mean emitted power in wats and antenna are in square meters) exceeding three million, except as provided for in Article III, IV and VI of the Treaty, or except for the purposes of tracking objects in outer space or for use as national technical means of verification.

[G]

The Parties understand that Article IX of the Treaty includes the obligation of the US and the USSR not to provide to other States technical descriptions or blue prints specially worked out for the construction of ABM systems and their components limited by the Treaty.

(*b*) *Common Understandings.* Common understanding of the Parties on the following matters was reached during the negotiations:

A. Location of ICBM defenses

The U.S. Delegation made the following statement on May 26, 1972:

Article III of the ABM Treaty provides for each side one ABM system deployment area centred on its national capital and one ABM system deployment area containing ICBM silo launchers. The two sides have registered agreement on the following statement: "The Parties understand that the centre of the ABM deployment area centred on the national capital and the centre of the ABM system deployment area containing ICBM silo launchers for each Party shall be separated by no less than thirteen hundred kilometres." In this connection, the U.S. side notes that its ABM system deployment area for defense of ICBM silo launchers, located west of the Mississippi River, will be centred in the Grand Forks ICBM silo launcher deployment area. (See Initial Statement [C].)

B. ABM test ranges

The U.S. Delegation made the following statement on April 26, 1972:

Article IV of the ABM Treaty provides that "the limitations provided for in Article III shall not apply to ABM systems or their components used for development or testing, and located within current or additionally agreed test ranges." We believe it would be useful to assume that there is no misunderstanding as to current ABM test ranges. It is our understanding that ABM test ranges encompass the area

within which ABM components are located for test purposes. The current U.S. ABM ranges are at White Sands, New Mexico, and at Kwajalein Atoll, and the current Soviet ABM test range is near Sary Shagan in Kazakhstan. We consider that non-phased array radars of types used for range safety or instrumentation purposes may be located outside of ABM test ranges. We interpret the reference in Article IV to "additionally agreed test ranges" to mean that ABM components will not be located at any other test ranges without prior agreement between our Governments that there will be such additional ABM test ranges.

On May 5, 1972, the Soviet Delegation stated that there was a common understanding on what ABM test ranges were, that the use of the types of non-ABM radars for range safety or instrumentation was not limited under the Treaty, that the reference in Article IV to "additionally agreed" test ranges was sufficiently clear, and that national means permitted identifying current test ranges.

C. Mobile ABM systems

On January 28, 1972, the U.S. Delegation made the following statement:

Article V (1) of the Joint Draft Text of the ABM Treaty includes an undertaking not to develop, test, or deploy mobile land-based ABM systems and their components. On May 5, 1971, the U.S. side indicated that, in its view, a prohibition to deployment of mobile ABM systems and components would rule out the deployment of ABM launchers and radars which were not permanent fixed types. At that time, we asked for the Soviet view of this interpretation. Does the Soviet side agree with the U.S. side's interpretation put forward on May 5, 1971?

On April 13, 1972, the Soviet Delegation said there is a general common understanding on this matter.

D. Standing Consultative Commission

Ambassador Smith made the following statement on May 22, 1972:

The United States proposes that the sides agree that, with regard to initial implementation of the ABM Treaty's Article XIII on the Standing Consultative Commission (SCC) and of the consultation Articles to the Interim Agreement on offensive arms and the Accidents Agreement, agreement establishing the SCC will be worked out early in the follow-on SALT negotiations; until that is completed, the following arrangements will prevail: when SALT is in session, any consultation desired by either side under these Articles may be carried out by the two SALT Delegations; when SALT is not in session, *ad hoc* arrangements for any desired consultations under these Articles be made through diplomatic channels.

Minister Semenov replied that, on an *ad referendum* basis, he could agree that the US statement corresponded to the Soviet understanding.

E. Standstill

On May 6, 1972, Minister Semenov made the following statement:

In an effort to accommodate the wishes of the U.S. side, the Soviet Delegation is prepared to proceed on the basis that two sides will in fact observe the obligations of both the Interim Agreement and the ABM Treaty beginning from the date of signature of these two documents.

In reply, the U. S. Delegation made the following statement on May 20, 1972:

The U.S. agrees in principle with the Soviet Union statement made on May 6 concerning observance of obligations beginning from date of signature but we would like to make clear out understanding that this means that, pending ratification and acceptance, neither side would take any action prohibited by the agreements after they had entered into force. This understanding would continue to apply in the absence of notification by either signatory of its intention not to proceed with ratification or approval.

The Soviet Delegation indicated agreement with the U.S. statement.

2. Unilateral statements

(*a*) The following noteworthy unilateral statements were made during the negotiations by the United States Delegation:

A. Withdrawal from the ABM Treaty

On May 9, 1972, Ambassador Smith made the following statement:

The U.S. Delegation has stressed the importance the U.S. Government attaches to achieving agreement on more complete limitations on strategic offensive arms, following agreement on an ABM Treaty and on an Interim Agreement on certain measures with respect to the limitation of strategic offensive arms. The U.S. Delegation believes that an objective of the follow-on negotiations should be to constrain and reduce on a long-term basis threats to the survivability of our respective strategic retaliatory forces. The USSR Delegation has also indicated that the objectives of SALT would remain unfulfilled without the achievement of an agreement providing for more complete limitations on strategic offensive arms. Both sides recginize that the initial agreements would be steps towards the achievement of more complete limitations on strategic arms. If an agreement providing for more complete strategic offensive arms limitations were not achieved within five years, U.S. supreme interest could be jeopardized. Should that occur, it would constitute a basis for withdrawal form the ABM Treaty. The U.S. does not wish to see such a situation occur, nor do we believe that the USSR does. It is because we wish to prevent such a situation that we emphasize we emphasize the importance the U.S. Government attaches to achievement of more complete limitations on strategic offensive arms. The U.S. Executive will inform the Congress, in connection with Congressional consideration of the ABM Treaty and the Interim Agreement, of this statement of the U.S. position.

B. Tested in ABM mode

On April 7, 1972, the U.S. Delegation made the following statement:

Article II of the Joint Text Draft uses the term "tested in an ABM mode," in defining ABM components, and Article VI includes certain obligations concerning such testing. We

believe that the sides should have a common understanding of this phrase. First, we would note that the testing provisions of the ABM Treaty are intended to apply to testing which occurs after the date of signature of the treaty, and not to any testing which may have occurred in the past. Next, we would amplify the remarks we have made on this subject during the previous Helsinki phase by setting forth the objectives which govern the U.S. view on the subject, namely, while prohibiting testing of non-ABM components for ABM purposes: not to prevent testing of ABM components, and not to prevent testing of non-ABM components for non-ABM purposes. To clarify our interpretation of "tested in a ABM mode," we note that we would consider a launcher, missile or radar to be "tested in ABM mode" if, for example, any of the following events occur: (1) a launcher is used to launch an ABM interceptor missile, (2) an interceptor missile is flight tested against a target vehicle which has a flight trajectory with characteristics of a strategic ballistic missile flight trajectory, or if flight tested in conjunction with the test of an ABM interceptor missile or an ABM radar at the same test range, or is flight tested to an altitude inconsistent with interception of targets against which air defenses are deployed, (3) a radar makes measurements on a cooperative target vehicle of the kind referred to in item (2) above during the reentry portion of its trajectory or makes measurements in conjunction with the test of an ABM interceptor missile or an ABM radar at the same test range. Radars used for purposes such as range safety or instrumentation would be exempt from application of this criteria.

C. No-transfer article of ABM Treaty

On April 18, 1972, the U.S. Delegation made the following statement:

In regard to this Article [IX], I have a brief and I believe self-explanatory statement to make. The U.S. side wishes to make clear that the provisions of this Article do not set a precedent for whatever provision may be considered for a treaty on Limiting Strategic Offensive Arms. The question of transfer of strategic offensive arms is a far more complex issue, which may require a different solution.

D. No increase in defense of early warning radars

On July 28, 1970, the U.S. Delegation made the following statement:

Since Hen House radars [Soviet ballistic missile early warning radars] can detect and track ballistic missile warheads at great distances, they have a significant ABM potential. Accordingly, the U.S. would regard any increase in the defenses of such radars by surface-to-air missiles as inconsistent with an agreement.

ANNEX D

Protocol to the Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitation of Anti-Ballistic Systems*

SIGNED AT MOSCOW JULY 3, 1974
INSTRUMENT OF RATIFICATION EXCHANGED MAY 24, 1976
ENTERED INTO FORCE MAY 24, 1976

The United States of America and the Union of Soviet Socialist Republics, hereinafter referred to as the Parties,

Proceeding from the Basic principles of Relations between the United States of America and the Union of Soviet Socialist Republics signed on May 29, 1972,

Desiring to further the objectives of the Treaty between the United States of America and the Union of Soviet Socialist Republics on the Limitations of Anti-Ballistic Missiles Systems signed on May 26, 1972, hereinafter referred to as the Treaty,

Reaffirming their conviction that the adoption of further measures for the limitation of strategic arms would contribute to the strengthening of international peace and security,

Proceeding from the premise that further limitation of anti-ballistic missiles systems will create more favorable conditions for the completion of work on a permanent agreement on more complete measures for the limitation of strategic offensive arms,

Have agreed as follows:

Article I

1. Each Party shall be limited at any one time to a single area of the two provided in article III of the Treaty for deployment of anti-ballistic missile (ABM) systems or their components and accordingly shall not exercise its right to deploy an ABM system or its components in the second of the two ABM system deployment areas permitted by article III of the Treaty, except as an exchange of one permitted area for the other in accordance with article II of this Protocol.

2. Accordingly, except as permitted by article II of this protocol: The United States of America shall deploy an ABM system or its components in the area centred on its capital, as permitted by article III (*a*) of the Treaty, and the Soviet Union shall not deploy an ABM system or its components in the deployment area of intercontinental ballistic missile (ICBM) silo launchers as permitted by article III (*b*) of the Treaty.

Article II

1. Each Party shall have the right to dismantle or destroy its ABM system and the components thereof in the area where they are presently deployed and to deploy an ABM system or its components in the alternative area permitted by article III of the treaty, provided prior to initiation of construction, notification is given in accordance with the procedure agreed to in the Standing Consultative Commission during the year beginning 3 October 1977 and ending 2 October 1978, or during any year which commences at five-year intervals thereafter, those being the years for periodic review of the Treaty, as provided in article XIV of the Treaty. This right may be exercised only once.

2. Accordingly, in the event of such notice, the United States would have the right to dismantle or destroy the ABM system and its components in the deployment area of ICBM silo launchers and to deploy an ABM system or its components in an area centred on its capital, as permitted by article III (*a*) of the Treaty, and the Soviet Union would have the right to dismantle or destroy the ABM system and its components in the area centred on its capital and to deploy an ABM system or its components in an area containing ICBM silo launchers, as permitted by article III (*b*) of the Treaty.

3. Dismantling or destruction and deployment of ABM systems or their components and the notification thereof shall be carried out in accordance with article VIII of the ABM Treaty and procedures agreed to in the Standing Consultative Commission.

Article III

The rights and obligations established by the Treaty remain in force and shall be complied with by the Parties except to the extent modified by this Protocol. In particular, the deployment of an ABM system or its components within the area selected shall remain limited by the levels and other requirements established by the Treaty.

Article IV

This Protocol shall be subject to ratification in accordance with the constitutional procedures of each Party. Is shall enter into force on the day of the exchange of instruments of ratification and shall thereafter be considered an integral part of the Treaty.

DONE at Moscow on July 3, 1974, in duplicate, in the English and Russian languages, both texts being equally authentic.

FOR THE UNITED STATES OF AMERICA
Richard Nixon
President of the United States of America
FOR THE UNION OF SOCIALIST REPUBLICS
L.I. Brezhnev
General Secretary of the Central Committee of the CPSU

* *Official Records of the General Assembly*, A/9698, Annex III, 9 August 1974.

ANNEX E*

Summary of the 1981 UN Report on ISMA

The UN Group of Experts identified two types of military surveillance mission that could be performed by the Agency, one of which was an "area surveillance" which yields observations with resolutions between 3 and 5 meters although the actual capacity of the observation is a variant of several elements because optical imaging sensors in the visible light can have resolutions in the range of approximately 1.5-2.5 m instantaneous field of view (IFOV) and infra-red (IR) sensors with resolutions of approximately 15-25 m IFOV. The other type of observation identified, "close-look imaging", could use optical sensors in satellites of a more powerful resolution in the range of 0.2-0.1 m (although better resolutions could be expected in a later stage). One important aspect noted by the Group was that photographic reconnaissance satellites are placed in orbits which position them in altitudes ranging from 150 km to 250 km as their perigee heights (which is the preferred height for this type of mission).** However, although there has been considerable progress, civilian satellites tend to be equipped with sensors having smaller resolutions as well as they are positioned in higher orbits than military ones.*** Whether performed by military or civilian satellites, the frequency of observation would depend on the nature of the mission concerned. For example, area surveillance of arms limitation and disarmament would prime over close-look. However, in monitoring crisis situations, the need to obtain photographs produced by very high resolution sensors in order to identify objects and events would demand that close-look imagery missions would be needed more often than general reconnaissance ones. The actual operational structure of the proposed Agency was not described in the Report, but some estimates were advanced on the order of magnitude for the work and cost of each progressive step suggested in the French proposal.

As shown in window 1 of Table XV, an estimated volume of processed data was advanced to determine the extent of the workload to be undertaken by the Agency. Despite their informal character, these figures indicate that the first phase would constitute a considerable workload, since processing and/or interpreting approximately 1000 scenes per month would require very sophisticated equipment and experienced manpower. However, this monthly average would vary according to the number of

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* The information and analysis contained in the following pages are selective and not intended in any way to substitute for the comprehensive study presented in the 1981 Report. See the report for detail and the discussion on legal implications.

** In a satellite's orbit, perigee is the point where it is closest to the Earth.

*** However, the Report finds it necessary to "...underline that there is no scientific agreement on the definition of 'resolution' of different sensors due to the influence of many factors" (see pp. 5-6 for a brief explanation). In addition, the Report also noted that some civilian satellites would have resolutions comparable to those of a camera on board a military area surveillance satellite if they were placed in orbits of lower altitudes of, say, 200 km.

Table XV

Main Estimates Related to the Establishment of an International Satellite Monitoring Agency

1

Possible Scenarios of Monitoring Frequency

Subject	Area Surveillance	Close-look
Surveyed area	15 x 10^6 sq. km	10 x 200 sq. km
Image (scene) size.....	100 x 100 sq. km	10 x 10 sq. km
Frequency of obser.....	twice a year	once a day
No. of scene/day.....	-	20
No. of scene/mount.....	250	600
No. of scene/year.....	3,000	-

2

ISMA Manpower Resources
(Phase I)

Group Task	No. of People	
	high	low
Administration and support	50	40
Development and checking of methods	25	15
Archives and data banks	30	20
Computer processing and analysis	2x30=60	2x25=50
Photo-interpretation	2x20=40	2x15=30
Computer systems	30	20
Photographic laboratory	25	15
Editing and distribution	25	15
Total:	285	205

3

ISMA Phase II Estimated Cost
(in 1980 million $)

Purpose	Capital cost per station	Operational cost per year	Global system 10 stations	Operational cost of Global system per year
Amount	6 - 8	2	60 - 80	20

4

ISMA Phase III Estimated Cost
(in 1980 $)

Purpose	Launch cost per satellite	Developmental period (in years)	Adequate coverage system§	Renewal cost per year
Type of Observ.				
Area Surveillance	300 - 400¶	4 - 6	0.9 - 1.2¶¶	50 - 200
Close-look	1.5¶¶	10	-	120§§

¶= Million dollars, including Research & Development
¶¶= Billion dollars
¶¶¶= Billion dollars, including Research & Development and other technical facilities needed for command and control.
§= Estimations comprise a tree-satellite system carrying combinations of optical, infra-red, and radar type sensors
§§= Based on one launching every two years

Source: Compiled from "The Implications of establishing and International Satellite Monitoring Agency," *Report of the Secretary-General*, New York: Department of Disarmament Affairs, 1983, pp. 44-46, 86, 86-87.

agreements to be monitored and the crisis situations to be handled. Estimates of the number of staff required were also presented, as may be seen in window 2 of the same table. However, the main manpower problem would be to set up several teams of experts in computer processing and analysis and photo interpretation experts. This would have to be worked out in advance to avoid the Agency's credibility being questioned during a period that many would consider as a "personnel training" stage. The capital to finance this phase of the Agency's work was estimated to be between 25 and 30 million US dollars a year (at 1980 prices).* To situate the magnitude of financial investment better, a comparable figure of the IAEA total safeguards operation (a total of 1980 inspections) expenditure in 1985 was in the region of US$30 million.** In general comparative terms, the operational cost of Phase I would not be very high considering the fact that the safeguards agreements carried out by the IAEA included obligations to the NTP Treaty, the Tlatelolco Treaty, and other nuclear material support programmes while, in contrast, both types of ISMA mission would cover a variety of agreements as well as crisis settlement situations.

The second phase of the French proposal was regarded by the Group of Experts as the first step of the Agency's independence in terms of data acquisition. Nevertheless, the Agency would continue to be very dependent on the cooperation of national satellites for its access to data. However, a system would be developed whereby national satellites would supply data to ISMA ground stations. While much of the equipment would have to be procured in phase I, certain receiving station components, such as microwave receivers, wideband demodulators, and bit synchronizers, would have to be purchased in this phase. The estimated operational cost of this phase (1980 prices) is shown in window 3 of Table XV.

The third and last developmental phase of the Agency would be the most complex and expensive one, but the acquisition of the space segment would enable the Agency to place a satellite system tailored to its specific needs in orbit which means that special purpose satellites could be conceived and equipped with the necessary sensor systems and encryption modules so as to optimize the ratio between mission assignments and existing monitoring techniques. An ISMA satellite would be equipped with a combination of several military satellite devices, the most important ones as being optical and IR imaging sensors (multiband or multispectral), microwave imaging radiometers (multispectral), microwave imaging radars such as Synthetic Aperture Radar (SAR), microwave precision altimeter, nuclear explosion detectors, and radio signal receivers ("electronic intelligence" acquisition receivers).***

To demonstrate the physical, technical, and other constraints in the creation of a monitoring satellite system, Diagram F portrays some of the basic orbital selections considered by the Group as being probabilities that the ISMA would have to face. The

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* "The Implications of Establishing an International Satellite Monitoring Agency", *Op. cit.*, p. 86. For different reasons, this estimate did not include fees that would have to be paid to States supplying remote sense imagery.

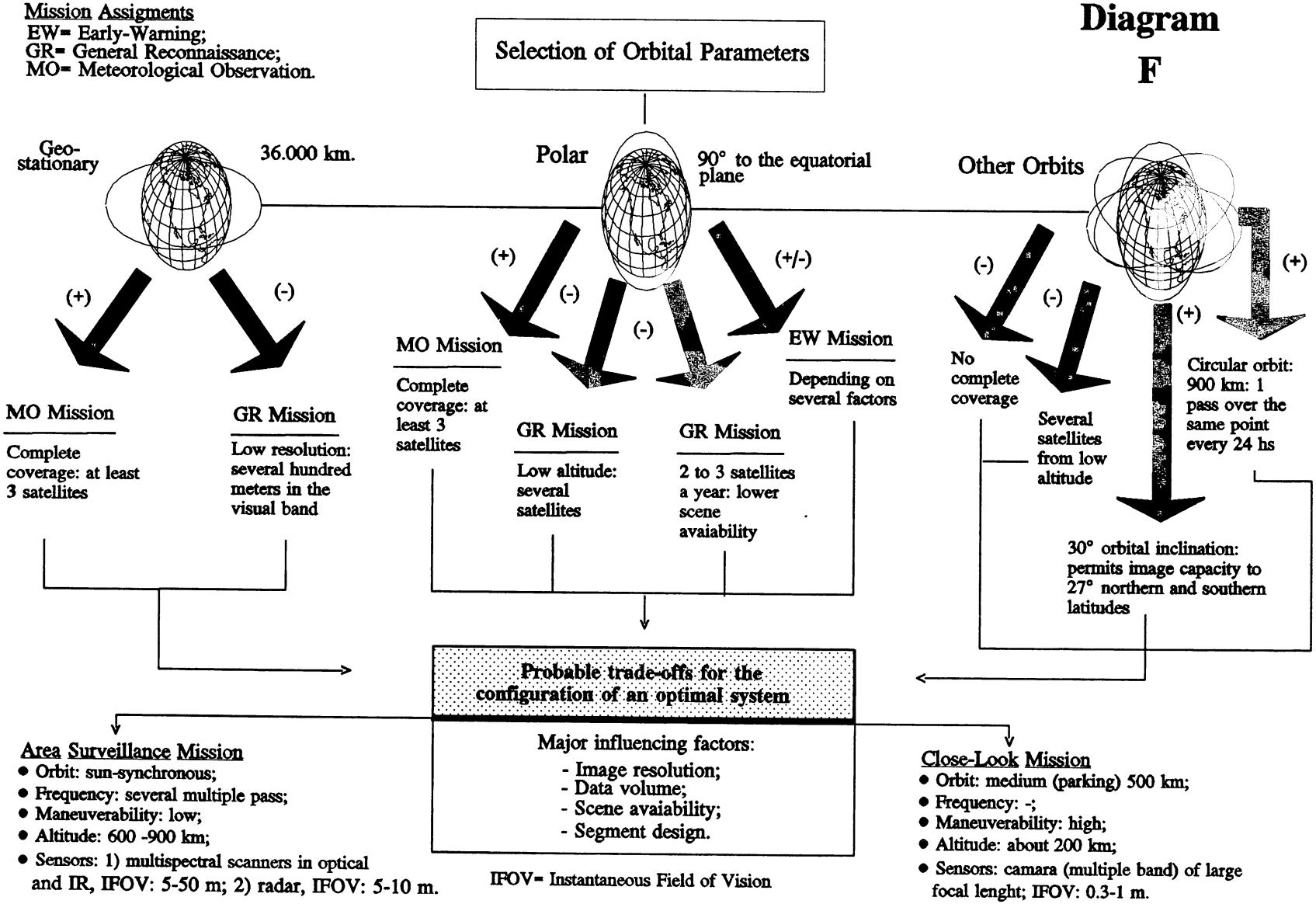
** *IAEA Safeguards 1980 - 1985: A Progress Report*, International Atomic Energy Agency, 1986, p. 1.

*** "The Implications of Establishing an International Satellite Monitoring Agency," *Op. cit.*, p. 40.

Basic Orbital Selections for ISMA Satellites

Diagram F

Mission Assigments
EW= Early-Warning;
GR= General Reconnaissance;
MO= Meteorological Observation.



Area Surveillance Mission
- Orbit: sun-synchronous;
- Frequency: several multiple pass;
- Maneuverability: low;
- Altitude: 600 -900 km;
- Sensors: 1) multispectral scanners in optical and IR, IFOV: 5-50 m; 2) radar, IFOV: 5-10 m.

IFOV= Instantaneous Field of Vision

Close-Look Mission
- Orbit: medium (parking) 500 km;
- Frequency: -;
- Maneuverability: high;
- Altitude: about 200 km;
- Sensors: camara (multiple band) of large focal lenght; IFOV: 0.3-1 m.

selection of orbital parameters depends on such influencing factors as the availability of the scene, the visible region of the electromagnetic spectrum, the local observation time, and the instantaneous field of vision of the sensors used in satellites. As may be seen in the Diagram, the optimal satellite system is a product of trade-offs among the various positive (+) and negative (-) aspects of a given orbit, the satellite technology, and the particular interests of a monitoring mission. While, for instance, a sun-synchronous orbit would simplify photo interpretation and computer analysis because of satellite track passes and solar elevation, the high altitude of geostationary orbits would have an negative impact on the resolution of imagery. Another factor (not portrayed in the Diagram) is that the design of the space segment would have an important repercussion on the price of a system. For example, high manoeuvrability satellites require considerable energy and different energy structures from those of low manoeuvrable satellites. Moreover, satellites designed to be placed in low altitudes (conceivably <500 km) are under atmospheric drag which reduces their lifetime. Therefore, more of these satellites would need to be launched to accomplish the ISMA's objectives. However, there are other vital aspects of the Agency' space segment that need to be carefully addressed to make it fully operational. For various reasons, the Expert Group expressed the view that the Agency should not possess but purchase satellite launching capabilities. Estimation of the cost of implementing this third phase show that considerable financial resources would have to be secured. Window 4 of Table XV, which is based on the worst case scenario, shows the price ranges for the Agency's principal activities.

In concluding their assessment of the establishment of an ISMA, the Group of Experts regarded the three proposed evolutionary phases with a favourable eye in both terms of practical feasibility and financial advantage. Nonetheless, other evolutionary structures were also contemplated by the Group, such as the grouping of phases II and III because of their close relationship in matters of training and operational impact. The Group of Experts also identified some technical shortcomings showing that access to available technology was not fully satisfactory at the time in the following terms:

> Existing and planned civilian remote sensing satellites do not have a capability to ensure a level of performance necessary for detailed observation of crisis areas for the identification of armaments subject to disarmament agreements. In the future, however, considerable progress may be expected which could bring the performance of civilian satellites close to military ones used for area surveillance. Such a development would be of great importance for the establishment of an ISMA since it would make available necessary data from sources other than military surveillance satellites.*

The acknowledgement that an ISMA could only fulfil its tasks by using military remote sensing showed that the establishment of an ISMA was profoundly linked to both the political aspects of States' relations and to the utilization of their military means. Thus, the establishment of an ISMA at that time would have been greatly dependent on the superpowers since they were the possessors of the most advanced military space technology.** Furthermore, the ISMA concept that the Group of Experts analyzed were

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* *Ibid.*, p. 21.

** For a reassessment of ISMA in light of subsequent developments in the field of verification and national space programmes, see "The ISMA Proposal- Time for

concerned only with technical requirements for space-to-Earth observations - in other words, only partial coverage of an agreement to prevent an arms race in outer space, because an effective monitoring system would doubtless require space-to-space and Earth-to-space monitoring capabilities.

Reappraisal?" by B. d'Aboville and M. Guionnet, *Space Policy*, May 1986, pp. 153-56.

ANNEX F

STATUS OF MEMBERSHIP TO TREATIES RELATING TO ACTIVITIES IN OUTER SPACE

TREATIES & ORGANIZATIONS	
PTBT	= Partial Test Ban Treaty (1963)
OST	= Outer Space Treaty (1967)
ARRA	= Agreement on the Rescue of Astronauts, the Return of Astronauts and the Return of Objects Launched into Outer Space (1968)
Lib. Conv.	= Liability Convention (1972)
Regis Con.	= Registration Convention (1975)
Moon Agr.	= Moon Agreement (1979)
Intelsat	= Agreement Relating to the International Telecommunications Satellite Organization (1971)
Inmarsat	= Convention on the Maritime Satellite Organization (1973)
Intersputinik	= Agreement on the Establishment of the *Intersputinik* International System of Organization of Space Communications (1971)
Arabsat	= Agreement on the Arab Corporation for Space Communications (1976)
ESA	= European Space Agency (1975)
Eutelsat	= Convention Establishing the European Telecommunications Satellite Organization (1982)
Eumetsat	= Convention for the Establishment of a European Organization for the Exploitation of Meteorological satellites (1983)
Intercomos	= Agreement on Cooperation in the Exploitation and Use of Outer Space for Peaceful Purposes (1976)

ABBREVIATIONS	
a	= Ratification, accession, succession; no reservations
b	= Ratification, accession, succession; reservations, clarifications or statements
c	= Signature; no ratification
d	= Declaration of acceptance

TABLE XVI

Status of Membership to Treaties Relating to Activities in Outer Space

Entity	PTBT	OST	ARRA	Liab. Conv.	Regis. Conv.	Moon Agr.	Intelsat	Inmarsat	Inter-sputnik	Arabsat	ESA	Eutelsat	Eumetsat	Inter-cosmos
• Afghanistan	a	a					a		a					
• Albania	a													
• Algeria	c			c			a	a		a				
• Angola							a							
• Antigua & Barbuda	a	a	a	a	a									
• Argentina	a	a	a	a	c		a	a						
• Australia	a	a	a	a	a	a	a	a						
• Austria	a	a	a	b	a	a	a				a	a		
• Bahamas, The	a	a	a				a							
• Bahrain								a		a				
• Bangladesh	a	a					a							
• Barbados		a	a				a							
• Belgium	a	a	a	a	a		a	a			a	a	a	
• Benin	a	a		a			a							
• Bhutan	a													
• Bolivia	a	c	c				a							
• Botswana	a	c	a	a										

• Brazil	a	b	a	a			a	a						
• Bulgaria	a	a	a	a	a			a	a					a
• Burkina Faso	c	a					a							
• Burundi	c	c		c	c									
• Byelorussian SSR	a	a	a	a	a			a						
• Cambodia				c										
• Cameroon	c	c	a				a							
• Canada	a	a	a	b	a		a	a			§			
• Cape Verde	a													
• Central African Republic	a	c		c			a							
• Chad	a						a							
• Chile	b	a	a	a	a	a	a	a						
• China, People's Republic of		a	a	a	a		a	a						
• Colombia	a	c	c	c			a	a						
• Congo							a							
• Costa Rica	a		c	c			a							
• Cote d'Ivoire	a						a							
• Cuba		a	a	a	a			a	a					a
• Cyprus	a	a	a	a	a		a					a		
• Czech and Slovak Federal Republic	a	a	a	a	a			a						a

§= Cooperation Agreement

Entity	PTBT	OST	ARRA	Liab. Conv.	Regis. Conv.	Moon Agr.	Intelsat	Inmarsat	Inter-sputnik	Arabsat	ESA	Eutelsat	Eumetsat	Inter-cosmos
• Denmark	a	a	a	b	a		a	a			a	a	a	
• Dominican Repepublic	a	a	c	a			a							
• Ecuador	a	a	a	a			a							
• Egypt	a	a	a	c			a	a		a				
• El Salvador	a	a	a	c			a							
• Equatorial Guinea	a	a												
• Ethiopia	c	c					a							
• Fiji	a	a	a	a			a							
• Finland	a	a	a	a			a	a			§	a	a	
• France		a	a	a	a	c	a	a			a	a	a	
• Gabon	a		a	a			a	a						
• Gambia, The	a	c	a	c										
• Germany	a	a	a	a	a		a	a			a	a	a	
• Ghana	a	c	c	c			a							
• Greece	a	a	a	a			a	a				a	a	
• Guatemala	a			c		c	a							
• Guinea							a							
• Guinea-Bissau	a	a	a											
• Guyana		c	a											

• Haiti	c	c	c	c			a							
• Holy See		c					a					a		
• Honduras	a	c		c			a							
• Hungary	a	a	a	a	a				a					a
• Iceland	a	a	a	c			a					a		
• India	a	a	a	a	a	c	a	a						
• Indonesia	a	c					a	a						
• Iran, Islamic Republic of	a	c	a	a	c		a	a						
• Iraq	a	a	a	a			a	a		a				
• Ireland	a	a	a	b			a				a	a	a	
• Israel	a	a	a	a			a	a						
• Italy	a	a	a	a			a	a			a	a	a	
• Jamaica	c	a	c				a							
• Japan	a	a	a	a	a		a	a						
• Jordan	a	c	c	c			a			a				
• Kenya	a	a		a			a							
• Korea, Democratic People's Rep. of									a					
• Korea, Republic of	a	a	a	a	a		a	a						
• Kuwait	a	a	a	a			a	a		a				

§= Associate Member

Entity	PTBT	OST	ARRA	Liab. Conv.	Regis. Conv.	Moon Agr.	Intelsat	Inmarsat	Inter-sputnik	Arabsat	ESA	Eutelsat	Eumetsat	Inter-cosmos
• Laos	a	a	a	a					a					
• Lebanon	a	a	a	c			a							
• Lesotho		c	c											
• Liberia	a							a						
• Libyan Arab Jamahiriya	a	a					a			a				
• Liechtenstein				a			a					a		
• Luxembourg	a	c	c	a			a					a		
• Madagascar	a	b	a				a							
• Malawi	a						a							
• Malaysia	a	c	c				a	a						
• Maldives			a											
• Mali	c	a		a			a							
• Malta	a		c	a								a		
• Mauritania	a						a			a				
• Mauritius	a	a	a				a							
• Mexico	a	a	a	a	a		a							
• Monaco			c				a					a		
• Mongolia	a	a	a	a	a				a					a
• Morocco	a	a	a	a		c	a							
• Mozambique	a						a	a						

• Myanmar	a	a	c											
• Nepal	a	a	a	c			a							
• Netherlands	a	a	a	a	a	a	a	a			a	a	a	
• New Zeland	a	a	a	b			a	a						
• Nicaragua	a	c	c	c	c		a		a					
• Niger	a	a	a	a	a		a							
• Nigeria	a	a	a				a	a						
• Norway	a	a	a	c			a	a			a	a	a	
• Oman				c			a	a		a				
• Pakistan	a	a	a	a	a	a	a	a						
• Panama	a	c		a			a	a						
• Papua New Guinea	a	a	a	a			a							
• Paraguay	c						a							
• Peru	a	a	a	c	a	c	a	a						
• Philippines	a	c	c	c		a	a	a						
• Poland	a	a	a	a	a			a	a					
• Portugal	c		a				a	a			a	a	a	
• Qatar				a			a	a		a				

Entity	PTBT	OST	ARRA	Liab. Conv.	Regis. Conv.	Moon Agr.	Intelsat	Inmarsat	Inter-sputnik	Arabsat	ESA	Eutelsat	Eumetsat	Inter-cosmos
• Romania	a	a	a	a		c	a		a					a
• Rwanda	a	c	c	c			a							
• San Marino	a	a	a									a		
• Saudi Arabia		a		a			a	a		a				
• Senegal	a		c	a			a							
• Seychelles	a	a	a	a	a									
• Sierra Leone	a	a	c	c										
• Singapore	a	a	a	a	c		a	a						
• Somalia	c	c	c				a			a				
• South Africa	a	a	a	c			a							
• Spain	a	a		a	a		a	a			a	a	a	
• Sri Lanka	a	a		a			a	a						
• Sudan	a						a			a				
• Swaziland	a		a				a							
• Sweden	a	a	a	b	a		a	a			a	a	a	
• Switzerland	a	a	a	a	a		a	a			a	a	a	
• Syrian Arab Republic	a	a	a	a			a			a				
• Tanzania, United Republic of	a			c			a							
• Thailand	a	a	a				a							

• Togo	a	a		a			a							
• Tonga	a	a	a											
• Trinidad & Tobago	a	c					a							
• Tunisia	a	a	a	a			a	a		a				
• Turkey	a	a	c				a	a				c	a	
• Uganda	a	a					a							
• Ukrainian SSR	a	a	a	a	a			a						
• Union of Soviet Socialist Republics	a	a	a	a	a			a	a					a
• United Arab Emirates							a	a		a				
• United Kingdom of Great Britain and Northern Ireland	a	a	a	a	a		a	a			a	a	a	
• United States of America	a	a	a	a	a		a	a						
• Uruguay	a	a	a	a	a	a	a							
• Venezuela	a	a	c	a			a							
• Viet Nam		a					a		a					a
• Western Samoa	a													
• Yemen (Aden)§	a	a	c						a	a				
• Yemen (Sanaa)§	a		a				a			a				
• Yugoslavia	a	c	a	a	a		a					a		

§= Merged to for a single state named Republic of Yemen on 22 May 1990

Entity	PTBT	OST	ARRA	Liab. Conv.	Regis. Conv.	Moon Agr.	Intelsat	Inmarsat	Inter-sputnik	Arabsat	ESA	Eutelsat	Eumetsat	Inter-cosmos
• Zaire	a	c	c	c			a							
• Zambia	a	a	a	a			a							
• Zimbabwe							a							
Organization														
• ESA				d	d	d								
• Eutelsat					d									

Source = Adapted from working papers presented in the *Ad Hoc* PAROS Committee, 1991. The information in this table reflects the status of treaties relating to outer space activities reported to the Secretariat of the United Nations up to 1 March 1991 inclusive.

ANNEX G*

LISTS OF TOPICS FOR GUIDANCE IN FUTURE DELIBERATIONS
(AD HOC PAROS COMMITTEE)

The present Annex contains the lists of topics that were presented by the Chairman corresponding to each one of the three items of the Committee's Programme of Work. The lists were elaborated to enable the Committee to structure its deliberations in an orderly and systematic manner. They do not represent in this sense an agreed or exhaustive listing nor do they reflect an order of priority among the items. The lists of topics reflect the questions on which the Committee has been working thus far and that could constitute a guide for future deliberations.

LIST OF TOPICS FOR DISCUSSION UNDER ITEM 1 OF THE PROGRAMME OF WORK: EXAMINATION AND IDENTIFICATION OF ISSUES RELEVANT TO THE PREVENTION OF AN ARMS RACE IN OUTER SPACE

I. The Prevention of an Arms Race in Outer Space as a matter of priority in the international agenda

1. Determination of the scope and objectives of multilateral work under the agenda item.

2. The status of Outer Space:

- as the common heritage of mankind which should be used exclusively for peaceful purposes;
- as the province ("apanage") of mankind.

3. The identification of the functions performed by space objects and of threats confronting them.

4. The need for identification and elaboration of mutually-agreed legal terms:

- possible elaboration of a glossary of relevant definitions;
- discussion or possible updating of Canadian working paper CD/716 on "Terminology Relevant to Arms Control and outer Space";
- additional sources: UNIDIR's report on Problems related to Outer Space (1987);
- other sources.

5. Examination of sufficiency or adequacy of the existing legal regime.

6. Approaches to reach a common understanding of what the existing legal norms do with regard to outer space activities:

- recognition of limitations of the existing regime.

7. Functioning of the existing legal instruments:

- encouragement of wider participation and fuller compliance as generally acceptable means for strengthening of the regime.

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* Extrated from the "Report of the Ad Hoc Committee on Prevention of an Arms Race in Outer Space," submited to the Conference on Disarmament," *Conference on Disarmament*, CD/1105, 23 August 1991, pp. 20-24.

II. Relationship between space activities, security and stability

1. The absence at present of weapons in space:

- acknowledgment of non deployment, at present, of weapons in outer space;
- existence of ground-based weapons aimed at space located targets; testing of air-based weapons aimed at space located targets;
- space-based weapons at research stage.

2. The relationship between the Prevention of an Arms Race in Outer Space and Arms Limitation and Disarmament Measures in other areas:

- interrelation between measures related to Outer Space and other aspects of the disarmament and arms limitation domain.

3. Vulnerability and immunity of satellites, their role and use for purposes of reliable verification.

4. Different concepts relating to International Verification Systems:

- comprehensive, combined;
- treaty specific;
- national technical means additioned by other methods suitable for multilateral agreements;
- analysis of technologies available.

5. Questions relating to compliance.

6. The need for information on how outer space is being used:

- confidence-building and predictability synthetic approach.

7. National Space programmes of military significance.

III. New trends and dimensions of the Arms Race and its possible impact on the prevention of an Arms Race in Outer Space

1. Impact of science and technology in the prevention of an arms race in outer space.

IV. Importance and scope of the bilateral negotiations between the Union of Soviet Socialist Republics and the United States of America

1. Harmonization of work at the bilateral and multilateral levels.

2. Role of the Conference on Disarmament.

List of Topics for Discussion Under Item 2 of the Programme of Work: Existing Agreements Relevant to the Prevention of an Arms Race in Outer Space

I. **General consideration on the legal regime applicable to Outer Space relevant to the prevention of an Arms Race in Outer Space**

1. Peaceful Uses.

2. Non-aggressive uses.

3. Military Uses.

4. Alternative approaches. The concept of Non Interference with Non Aggressive Activities of Space Objects.

II. Sources

1. Customary Law.

2. The Charter:

- Preamble;
- Article 1 (1);
- Article 2 (2) and (4);
- Article 51.

III. The Outer Space Treaty of 1967

1. Article IV:

- scope of the prohibition;
- possibility to ban activities or weapons not included in the prohibition set forth by Art. IV through the development of the concept of Non Interference with Non Aggressive Activities of Space Objects.

2. The question of the principle of exclusive use for peaceful purposes as reflected in the Treaty.

3. Perceived lacunae.

4. The question of the existence of a "double" regime applicable to Outer Space.

IV. Adequate/Inadequate-Sufficiency/Insufficiency

1. Limitations and loopholes.

2. Consolidation, reinforcement, development:

- by direct amendments;
- through an indirect approach (CBMs).

3. Participation.

V. The role of the Bilateral Agreements

1. The ABM Treaty.

VI. The Strategic Defenses

1. Their impact on the problem under consideration:

- protection against ballistic missile attacks.

List of Topics for Discussion Under Item 3 of the Programme of Work: Existing Proposals and Future Initiatives on the Prevention of an Arms Race in Outer Space

I. The Outer Space Treaty

1. Existing restriction and scope of the instrument.

2. Amendment proposals:

2. A. Analysis of the consistency of Art. IV under the perspective of the regime applicable to Outer Space as distinct from the one confined to the Moon and Other Celestial Bodies. Consequential amendments.

2. B. Extension of the present prohibition to all kinds of weapon systems (CD/851).

2. C. Enlargement of the prohibition spelt out in Art. IV to make it applicable to any kind of weapon system (CD/939).

II. Anti-Satellite Weapon System (ASATs)

1. Banning of all ASAT weapons.

2. The question of banning dedicated ASAT weapons/specialized ASAT systems.

3. Banning of ASAT-mode testing of other weapon devices.

4. Gradual approach: 1. first use limitations; 2. rules of the road leading to a Comprehensive Ban on Satellite Intercept Capability.

5. Conclusion of an Additional Protocol for the purpose of prohibiting the development, production, storage and deployment of anti-satellite weapons not stationed in Outer Space.

III Confidence-Building Measures

1. Synthetic Approach. Confidence Building and Predictability Measures in Outer Space.

2. Improvement of Data Bases.

3. The Registration Convention:

1. strengthening of its regime:

1. A. Additional protocol;

1. B. Refinement of information to be supplied as provided for in Art. IV of the Convention;

1. C. Possible additional criteria:

- pre-launch information;
- announcement of parameters;
- updating;
- other.

2. Voluntary Data Exchange.

2. A. Declaration of Non Deployment of Weapons in Outer Space.

3. Rules of the Road:

3. A. Restrictions on very low altitude overflights by manned and unmanned spacecraft.

3. B. Advanced notice of launch activities.

3. C. Specific rules for agreed and possible defended "keep-out" zones.

3. D. Grant or restrictions of the right of inspections.

3. E. Limitations to high velocity fly-bys.

3. F. Limitations on trailing.

3. G. Consultation on ambiguous situations.

4. Code of Conduct Concept:

4. A. Codification of the principle of non-interference with non-offensive space activities.

4. B. International Trajectography Centre - UNITRACE.

5. Data base.

5. A. Establishment of a Data Base on the launching of satellites and the collection and classification of technical data.

6. Combined Approaches.

6. A. The "Open Outer Space" Concept.

IV. The Role of the New Technologies

1. Non Nuclear Defences against strategic ballistic missiles.

2. Phased program for co-operative transition to increasing reliance on such defences.

3. Predictability Measures.

V. Verification

1. General:

1. A. Interrelationship between verification in space and on earth's surface related to space.

1. B. Definitional questions (identification of space activities which have inherent arms application).

1. C. Practical difficulties including resources and funding.

1. D. The need to evolve from the almost exclusive use of National Technical Means of Verification to other methods involving multilateral agreements.

2. Second Additional Protocol on Verification. Ref. CD/939

3. Verification of Space activities. The question of confidentiality. Disclosure of information.

4. Utilization of commercial space based remote sensing imagery.

5. Agency for Processing of Space Images.

6. Protection (immunity) of satellites serving as National Technical Means of Verification.

7. Technologies available:

7. A. Microwave radar imaging.

7. B. Satellite-borne sensors.

7. C. Infra-red devices.

7. D. Tagging of satellites.

7. E. Other.

GLOSSARY

A

ABM interpretation: Four terms have been used to describe interpretations of legal limitations established by the ABM Treaty: *traditional*, *restrictive*, and *narrow interpretation* or *broad interpretation*, and *reinterpretation*. The terms *traditional*, *restrictive*, and *narrow interpretations* generally refer to an interpretation of the Treaty which both the Soviet Union and the United States appear to have subscribed to from the signing of the Treaty. This interpretation covers both traditional ABM components such as interceptors based on KEWs and technologies based on other physical principles such as DEWs. In contrast, the terms *broad interpretation* and *reinterpretation* are used to describe a different interpretation of the ABM Treaty as expressed by the United States in 1985 and which would establish limitations only on traditional ABM components. The issue of interpretation, or reinterpretation, of the ABM Treaty is being discussed by the Soviet Union and the United States in their bilateral Nuclear and Space Talks/Defense and Space Talks.

Anti-Ballistic Missile (ABM): A defence system designed to intercept ballistic missiles.

Anti-Satellite Weapon (ASAT): A weapon designed to destroy or disable a satellite in space by nuclear or conventional explosion, collision at high speed, or directed energy beam. ASAT weapons may be ground or space-based, air or sea-launched.

Anti-Tactic Ballistic Missile (ATBM): A system of defence designed to intercept short-range ballistic missiles.

Apogee: The point in an orbit of an Earth satellite which is furthest from the Earth.

B

Ballistic Missile (BM): A missile that is propelled into space by a booster rocket and which descends towards its target under a free-fall, performing a ballistic trajectory.

Ballistic Missile Defence (BMD): See Anti-Ballistic Missile.

Beam weapon: See Directed Energy Weapon, .

Boost phase: The first phase of a ballistic missile flight - usually lasting from 3-5 minutes.

Brilliant Pebbles: A boost and post-boost space-based interceptor concept based on the principle of Kinetic-kill. Brilliant Pebbles, which will probably be deployed in the Phase I of SDI, will provide integrated sensors, guidance, control, battle management and several thousands of single interceptors.

Broad interpretation: See ABM interpretation.

C

Chemical laser (Cls) weapon: The concept of a weapon powered by deuterium and fluoride, oxygen and iodine and yielding radiation in the form of a laser beam.

D

Dedicated space weapons: Weapons specially designed to strike targets in space, on the ground, at sea, or in the air, whatever their place of deployment.

Defense and Space Talks (DST): Bilateral USSR/US negotiations dealing with strategic defense matters, including the interpretation/reinterpretation of the ABM Treaty.

Directed Energy Weapon (DEW): A weapon based on beams of energy to destroy or damage its target.

E

Early warning: The early detection of an incoming attack by space-based and Earth-based surveillance devices.

Electromagnetic Pulse (EMP): The discharge of electromagnetic energy produced by a nuclear explosion.

Electromagnetic Railgun: See Railgun.

Endo-atmospheric launcher: A vehicle designed to boost a payload up to the limits of the atmosphere - generally considered as altitudes below 100 km.

Equatorial orbit: A circular orbit above the equator.

Excimar lasers (Els) weapon: The concept of a weapon powered by krypton-fluoride or chlorine-xenon molecules - near ultraviolet to visible region of the electromagnetic spectrum yielding a laser beam.

Exo-atmospheric activity: A vehicle designed to boost a payload beyond the limits of the atmosphere and therefore into outer space generally considered as altitudes above 100 km.

Exotic technology: A term used to refer to devices based on principles such as laser and particle beam. See Directed Energy Weapon, Excimar lasers (Els) weapon, Chemical laser (Cls) weapon, Free-electron laser (FEL) weapon, Neutral Particle Beam (NPB) weapon.

F

Follow-on Phases: See Strategic Defense Initiative.

Free-electron laser (FEL) weapon: The concept of a weapon powered by electron beam (infra-red radiation) yielding a laser beam.

G

Geosynchronous orbit: An orbit - also referred to as geostationary orbit - located nearly 36,000 km above the Equator, where a satellite travels at the same speed relative to a point situated on the Equator. Satellites in this orbit appear stationary above a specific point on the Equator.

H

Heliosynchronous orbit: A satellite orbit whose orbital plane progresses by one degree a day around the line of the poles. A satellite in such an orbit keeps the same position in relation to the Earth-Sun line.

High Endoatmospheric Defense Interceptor (HEDI): An interceptor designed to counter Soviet incoming warheads being tested for SDI.

Hipervelocity gun: See Railgun.

Horizontal Proliferation: the increase in the number of countries possessing a given type of arm or arm capability.

I

Infra-red sensors: A device capable of detecting the infra-red (IR) radiation from a targeted object.

Instantaneous Field of View (IFOV): The amount of space or ground observed at the instant of observation by the sensor of a scanner.

Intercontinental Ballistic Missile (ICBM): A ground-based ballistic missile with a range equal to or greater than 5,500 km.

Interference (contractual definitions):
1982 ITU Convention: The term *harmful interference* means an act which endangers the functioning of a radionavigation service or of other safety services or seriously degrades, obstructs or repeatedly interrupts a radiocommunication service operating in accordance with the Radio Regulations. Radiocommunications, in turn, is to be understood as a telecommunication by means of electromagnetic waves of frequencies lower than 3000 GHz and which are propagated in space without artificial guide.

USSR/USA 1989 Prevention of Dangerous Military Activities Agreement: Interferences are actions that hamper, interrupt or limit the operation of the signals and information transmission means and systems providing for the control of personnel and equipment of the armed forces of a Party.

K

Kinetic Energy Weapon (KEW): A weapon which destroys or damages its target by direct impact or collision.

L

Laser [Light Amplification by Stimulated Emission of Radiation] weapon: A device that produces an intense beam of *coherent electromagnetic radiation*.

Low orbits: A band of space around the Earth varying from 150 to 1,500 km.

M

Mid-course phase: The phase of a ballistic missile flight in space after the boost phase and before re-entry into the atmosphere - usually lasting 20-25 minutes.

Molniya orbit: An elliptical satellite orbit usually characterized by a perigee of about 500 km and apogee of about 40,000 km.

N

Narrow interpretation: See ABM interpretation.

National Technical Means (NTMs): Space-based and Earth-based devices used to gather intelligence and under national control. For example, USSR and US reconnaissance satellites are used to monitor compliance with bilateral arms limitation and disarmament agreements.

Neutral Particle Beam (NPB) weapon: The concept of a weapon powered by electron acceleration of hydrogen ion yielding a neutral beam.

Non-dedicated space weapons: In principle, non-dedicated space weapons are weapons which, while not space weapons as such, have some inherent capability which could convert them into space weapons.

Nuclear and Space Talks (NST): Geneva-based negotiations between the Soviet Union and the United States encompassing strategic and intermediate nuclear forces and defence and space matters.

O

Orbit: The path of a satellite under the influence of the Earth's gravitational force, whereby the satellite returns to the same point.

P

Particle beam: An energy beam of atoms or subatomic particles.

Pellet-warhead: A device based on the kinetic kill principle, the warhead of an interceptor satellite being charged with several metal pellets which are projected towards a targeted object in space, destroying or damaging it on impact.

Phase I of SDI: See Strategic Defense Initiative.

Phase II of SDI: See Strategic Defense Initiative.

Phased-array radar: A high-speed and highly accurate radar used, *inter alia*, in ABM systems. One of the particular characteristics of this type of radar is that it points its beam in different directions by electronically moving its antenna other radars move their antenna mechanically and are usually slower than Phased-array ones.

Perigee: The point in an orbit of an Earth satellite which is closest to the Earth.

Polar orbit: A satellite orbit in which the orbital plane contains the Earth's axis of rotation.

R

Radar [Radio detection and ranging] (space-based): An active sensor which records the radiation reflected by microwave energy previously emitted to the Earth by the same sensor.

Railgun: A weapon in which an object (projectile) is accelerated by electromagnetic forces, and not

by explosion in a conventional gun between two metal rails.

Reinterpretation: See ABM interpretation.

Resolution: A term used to determine the size of objects to be detected by an image sensor. The smaller the resolution parameters the more details will be visible in the image produced by optical systems. The parameters of a resolution are a factor of the distance between the detector and the targeted object (orbit height), different atmospheric turbulances and other factors.

S

Satellite ground segment: The ground component of a satellite system including mission assignment, data-processing, and communication facilities.

Satellite space segment: The space component of a satellite system consisting of satellites.

Space-Based Interceptors (SBIs): Interceptors under development for SDI designed primarily to counter Soviet incoming missiles and warheads in their boost and post-boost phases of flight.

Space mine: A space object carrying an explosive charge which could be used to damage or disable another object in space.

Space weapons: See Dedicated space weapons and Non-dedicated space weapons.

Star Wars: See Strategic Defense Initiative.

Strategic Defense (SD): A system of defense aimed at rendering a strategic nuclear attack ineffective by employing various methods of ground and space-based defence against incoming strategic missiles and their re-entry vehicles.

Strategic Defense Initiative (SDI): A programme initiated in 1983 which is designed to develop a ballistic missile defense (BMD). At present, SDI consists of four BMD missions: A Hedge Mission, An Accidental Launch Protection System, A System to Protect Silo-Based ICBMs, and the Adminstration Mission. Deployment of SDI is to be primarily structured in two initial stages, Phase I and II, where ground and space-based KE weapons would be deployed. Potential Follow-on Phases would then probably involve the deployment of ground and space-based space weapons based on other principles such as DE weapons.

Strategic Defense Initiative Architecture: The description of all system functional activities to be performed to achieve the US SDI desired level of defence. It includes the system elements needed to perform the functions and the allocation of performance levels among those system elements.

Submarine-Launched Ballistic Missile (SLBM): A ballistic missile deployed on a submarine.

Sun-synchronous orbit: A polar orbit with orbital parameters such that a satellite crosses the Earth's equatorial plane at the same local time.

Synthetic Aperture Radar (SAR):

T

Traditional interpretation: See ABM interpretation.

Terminal phase: The final phase of a ballistic missile - usually lasting one or two minutes.

Theatre: A zone of potential or actual conflict.

V

Vertical Proliferation: The quantitative increase of arms, or arms capability, in the arsenal of a given country.

X

X-ray Laser (XrLs) weapon: A weapon concept consisting of beams of coherent X-rays produced by a nuclear explosion.

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